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FIG. 1. VIEW OF THE RETORT AND PURIFYING HOUSES OF GAS WORKS FOR SMALL WORKS.

FIG. 2. GROUND PLAN OF GAS WORKS FOR A TOWN OF 30,000 INHABITANTS.

Gas Works for Small Towns.

We publish on this page drawings taken from the *Nouvelles Annales de la Construction*, illustrating the general arrangement of a gas work suitable for a town of about 30,000 inhabitants. The plan, which may be considered a type of its class for French practice, is due to M. Perret, an engineer of Paris. The retort house contains four benches of seven retorts each, and one bench with three retorts; of the four, three always are in use, the fourth being kept in reserve, and the smaller bench is used only when an increased demand brings a pressure upon the works. The position and arrangement of the condensers, scrubbers, purifyers, exhausters, and gasholders are shown clearly in the plan. The position of the tar tank S is seen in the small section, fig. 3.

The ordinary production is 2,500 cubic feet of gas per hour, and this can be increased to 3,000, and even 4,200 feet, if necessary. The cost of such works as those here illustrated varies of course according to local conditions; it may, however, be estimated at from $4 to $6 per head of population, this price including, besides the buildings and plant, the system of mains and general fittings. Thus, in a town of 30,000 inhabitants, such an establishment would cost from $120,000 to $180,000.

For further explanation we will add that A A, fig. 2, is the wall surrounding the works; B, figs. 2 and 3, is the entrance, closed by a gate; C C, figs 1 and 2, are coal sheds; F, figs. 1 and 2, is the retort house, seen also in fig. 3, while its smoke-stack J is seen in all the three figures. The receptacles for tar and the four purifyers V are seen at the right hand of the retort house in fig. 2. At the right hand of the four purifiers is the pump which drives the gas into the two

gasholders, so as to relieve the rotorts from all pressure; the gas mains between them are seen in E. The plan of the offices, represented at the lower left-hand corner of fig. 2, are in fig. 3 seen above the gasholders. These have one large story over the four spaces below. Next to them is the gas meter E, fig. 2, by which the total amount delivered to the city is recorded.

We ought finally to state that these engravings are not intended to give an idea of the best possible arrangement as now adopted in the United States. It

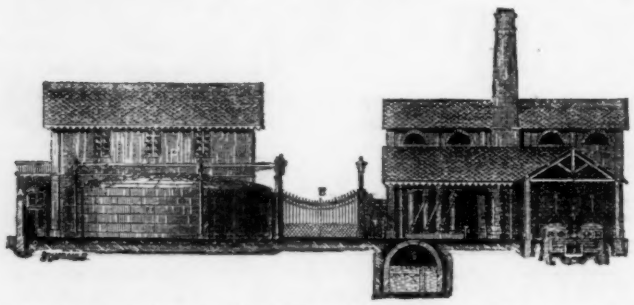

FIG. 3.—SIDE VIEW OF GAS WORKS REPRESENTED IN FIGS. 1 AND 2, LOOKING FROM RIGHT TO LEFT.

s our peculiar capacity for making improvements which distinguishes American factories above all others For instance, the purifiers are old style, which may do well enough for France, but have been abandoned here.—*Manufacturer and Builder.*

The Flushing Gas-Works.

The original charter granted for the formation of the company was procured in 1856 by Messrs. Chas. A Willetts, Gilbert Hicks and Jas. M. Lowerwe, for the term of twenty years. The works erected were located, as they are at present, on Myrtle avenue, between Farrington and Lawrence streets. The building erected was a small, insignificant wooden structure. After several years Messrs. Hicks and Lowerwe disposed of their interest in the enterprise to several parties, making the number of stockholders now about ten. Four years ago the present company with a capital of $41,000, resolved to erect more substantial buildings, and three brick structures, costing $25,000, were put up. The house fronting on the avenue is two stories in height, and in dimensions 30 by 40. The basement is used as a machine shop, while in the two upper stories reside the foreman and his family. On the second story is also a small room in which are the governor, which regulates the pressure, and the huge meter, which measures the gas manufactured. In the basement are also a boiler and pump which supplies the water used in the works, taking it from a well 29 feet deep, which always has 17 feet of water. The water is pumped into a huge 3,000 gallon tank over the boiler room. In the rear of this building are the purifying room, 30 feet square, and a small wing n which is kept the shell lime used in purifying. Built against this room is the retort house 32 by 45, very high storied, and covered with an iron roof. In this place are nine retorts, six of which only are used in summer. At the right of the works are the coal shed, holding 150 tons, a small valve-house in which the supply is controlled by a series of valves, and two gasometers, one 50 feet in diameter, in a tank 17 feet deep, and the other 36 feet in diameter, in a tank 13 feet deep. These holders together have a capacity of 40,000 feet, which is two days' supply in winter, and three and a half days in summer. The company estimate that at an expense of not more than $8,000 they could enlarge their works so as to be able to supply three such villages as Flushing, as the average consumption of gas the present season is but 8,000 feet a day, while during the cold months only 14,000 feet additional are required per day. The number of consumers is about 300, they paying $4 per thousand ft. The sixty street lamps cost the village $28 a year each. To meet the expenses of the company about $14,000 yearly is required. The services of two firemen, one laborer, and a foreman are constantly required, while coal, piping, etc., cost very heavily. Eight or nine miles of pipe are already down, and before the close of the season two additional miles will be laid. The present officers of the company are Chas. Lever, President; Chas. A. Willetts, Treasurer; James B. Brewster, Secretary. The foreman is Dennis Sullivan.

The company are proud of their works, and they are justified in so thinking. Situated on three-fourths of an acre of ground, fronting on one of the finest streets in the village, with neat and substantial buildings, carefully kept grounds, and scrupulously tidy surroundings, cannot often be excelled, and concrete walks and good fences around the buildings give it an appearance very different from that usually presented by such works. From what was formerly a nuisance and an eyesore to every one in the vicinity, it has now become an ornament to the street and a matter of personal pride to all in its vicinity. The existence of similar works in the United States that can surpass it in these respects is very doubtful. Another thing in which this company stands alone is that during the war the special war tax, amounting to fifteen cents per thousand feet, authorized by the Legislature, was never imposed or collected from their consumers. Taken as a whole our gas works is a model institution.—*Flushing Times.*

A Pennsylvania Gas Well.

A correspondent of the *Scientific American* gives the following description of a gas well:

I wish to give you some description of a gas well here in the Butler county oil fields. It is situated about two miles from the viltage of Fairview, and was drilled last June in search of oil. It was put to the depth of 1,200 feet, and was abandoned on account of a strong flow of salt water and gas; so much came out that the boiler that made the steam had to be moved to a distance of twenty-five rods. After the well had been abandoned about two months, the pressure of gas became so strong that it forced the water entirely out of the hole, and last fall a company was formed here to utilize the gas, which was done by bringing it through 3½ inch pipe here to Fairview and thence to Petrolia, three miles from Fairview. The gas will be used to light and warm both places. I visited the well in company with two other gentlemen; the gas is taken out of the well through three-inch pipes into an old fashioned two flued steam boiler; upon the boiler is placed a steam gauge which indicates a steady pressure of 80 lbs. The boiler has also upon it two safety valves steadily blowing off, also a cock in the boiler of one inch in diameter open all the time. This well has also an escape through a six-inch pipe, the noise of the escaping through which can be heard readily for a distance of two miles. I was told by a gentleman here that the main discharge was closed for a second of time, when the indicator on the steam gauge instantly flew around to its utmost capacity, which is 250 pounds. This well is a great curiosity in the neighborhood.

Machinery is now doing the work of stokers in a London gas company's manufactory. Hitherto the retorts wherein gas has been distilled from the coal have been placed horizontally; in the new method they are placed vertically. The retorts are iron tubes exposed to great heat. In each tube an Archimedean screw turns round. The coal falls in slowly from the top, descends slowly with the movement of the screw, gives off all its gas on the way, and the coke falls from the bottom. The advantage of this over the horizontal method is shown by the fact, that for every ton of coals converted it yields more coke and 2,000 ft. more gas.—*Tribune.*

Chemical Repertory.

No. 95.—July 2, 1873.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

777. THE WATER WORKS Committee of Flushing has instructed an engineer to examine the ground known as Spring lane and the land adjoining, and to report to the Trustees its practicability as a water supply. The sum of $500 was appropriated to defray the expenses. C. W. Howard was elected Street Commissioner, with a salary of $500.

778. ENGLISH PATENT No. 3269 of 1873, to G. Goldsmith and J. Dilkes, Leicester—*Improvements in the means of and apparatus for removing obstructions from gas pipes.*—The object of this invention is to afford means for clearing gas pipes, especially services, and consists in forming a plug furnished with a barrel which is to be filled with gunpowder and inserted in the offending pipe. The charge is then to be fired by striking a percussion-cap placed on a nipple on the outside of the plug, when an explosion ensues, and the removal of any obstruction is the result.—*Iron.*

779. VAPORS EMITTED AT THE SAME TEMPERATURE BY THE SAME BODY IN TWO DIFFERENT STATES.—M. Moutier had formerly shown that such vapors had different tensions. Water at freezing point emits vapor, the tensions of which are unequal, according as the water is taken in the liquid or the solid state. He now finds these results confirmed, from a study of the specific heats of saturated vapors.—*Comptes Rendus.*

780. NEW GAS.—A company has been formed under the name of the "Home and Foreign Gas Licensing Company (Limited)," for the purpose of working "Parker's Gas" patents. The process consists in utilising coal-dust, which being mixed with caustic lime, is distilled in pretty much the ordinary manner. Gas is also to be made from petroleum which has previously been absorbed by lime. The mixture is said to be perfectly safe to handle and transport. The process is reported to have been successfully tried at the Bewdly and Bromyard gas-works.—*Jour. Soc. Arts.*

781. PRESERVE-CANS.—After the conclusion of the meeting, Mr. Elmslie exhibited some specimens of tins for holding preserved meats, etc. Round the upper edge of each tin a wire is inserted below the cover; the ends of the wire project sufficiently to allow of this being seized with a key or fork provided for the purpose, so that the wire may be drawn out, cutting off the cover of the tin as it comes. The invention appeared one of considerable simplicity and convenience.—*Jour. Soc. Arts.*

782. THERMO-DIFFUSION.—M. Jedderson says, in *Poggendorff's Annalen*, that if a porous body be made in the form of a diaphragm and each face be exposed to a different temperature, a current of gas is immediately formed from the colder to the hotter side. The author considers this phenomenon as entirely differing from ordinary diffusion, and proposes to distinguish it by the name heading this paragraph.—*Sci. Am.*

783. SAL-AMMONIAC IN THE HYDRAULIC MAIN.—R. Gasch.—While the hydraulic main of the gas-works at Dresden was being cleaned a large quantity of a whitish-colored saline mass was met with, mixed up with the inspissated tar. At first this saline matter was taken to be bicarbonate of ammonia, but on being chemically tested the salt was found to be chloride of ammonium. The author found that the salt is derived from the Zwickau coals, which (see *Chemical News*, vol, xxvi., p. 226) contain a considerable quantity of common salt. Sal ammoniac is now a regular by-product of the Dresden gas-works.—*Jour. fuer Gasbeleuchtung.*

784. SINGULAR.—At a late meeting of the Edinburgh Royal Society, Mr. Sang directed attention to the behaviour, under the microscope, of an air-bubble detected when examining the polished striæ covering the surface of Iceland spar. When applying the point of a pen-knife to scratch the spar, the bubble was seen to fly away from it. Mr. Sang attributed this singular phenomenon, not to magnetism, or pressure on the sides of the cavity—distinct experiments contradicted these probable causes—but to repulsion. Brass, copper wire, printing type, silver and copper coin all sent the air bubble instantly to the opposite side of the cavity, but wood, glass, and ivory had no effect. This was a new field for physical investigation.—*Iron.*

785. DIAMONDS IN THE ELECTRIC LIGHT.—At the conclusion of Prof. Tyndall's third lecture on "Light," on Thursday, at the Royal Institution, a gorgeous spectacle, which is seldom seen, was afforded to the delighted audience. Mr. Streeter had sent a tray of diamonds, set as necklets and other ornaments, upon which were directed the powerful rays from the electric lamp. The display of color by refraction was superb, while the specks of light reflected from the facets upon the walls conveyed the impression of a starlight night. The brilliancy of well-cut diamonds could hardly have received better illustration.—*Ibid.*

786. THE GAS-LIGHT ASSOCIATION OF THE U. S.—We learn of the recent organization of a National Association of the American Gas Fraternity.

The need of such a union for promoting the development of this important interest, in its scientific and commercial aspects, has long been felt, and earnest and repeated efforts have been put forth to bring about the important movement, of which it is our pleasure to announce the inauguration. It is to be wished that it may prove as beneficial in its working to all interested as the numerous kindred associations abroad, and it is to be hoped will mark a new era in the history of gas in America.

The following gentlemen have been elected officers of the new Association:

President, Chas. Roome, N. Y., president Manhattan Co.; 1st Vice President, P. E. Demill, of Michigan; 2d Vice President, W. H. Price, of Ohio; 3d Vice President, Thos. R. Brown, engineer Philadelphia Gas Works; Secretary, Prof. Henry Wurtz, of New York; Treasurer, J. W. Smith, of New York.—*Jour. Franklin Inst.*

787 DRAINING THE HOBOKEN MEADOWS.—The Hoboken Drainage Commissioners have purchased machinery consisting of an engine and two centrifugal pumps to be placed at the sluice gate near the Morris and Essex Railroad, where the Ferry street sewer discharges its water, and will have wells made at a level that will drain the meadow land by means of ditches. The pumps are warranted to throw out 2,400 gallons of water each minute. but they can be made to throw out 3,000 to 4,000 gallons per minute. This will have an immense effect on the meadows, and only during storms will the machinery have to run at all. The outlay for the engine, pumps, and shanty, together with suitable foundations will cost about $2,000, perhaps a little more, say $500, may be needed in opening drains to draw water from the pockets where it lodges and stagnates. The man to attend to the machinery can also attend to the sluice-gates, where the tide water ebbs and flows to the meadow, for which a considerable amount is now paid by the city, so that on the matter of regular expense the difference won't amount to anything. The machinery will probably be put up during the coming week, and after being put in perfect condition must wait for a storm. The Commissioners have postponed making any plan of drainage until this matter of pumping during storms is thoroughly tested.—*Jersey City Times.*

788. PURIFICATION OF GLYCERINE USED IN GAS-METERS.—The glycerine used in gas-meters becomes gradually saturated with ammonia, tar, acids, water, etc.; it then attacks the metal, and is no longer incapable of freezing. Hasse recommends it to be changed every year. To purify the glycerine, it is heated in cylindrical boilers, first to 50°, 60°C, and afterwards to 130°, until neither acid vapors nor ammonia are disengaged; it is then allowed to cool slowly. The glycerine is then run off and filtered over animal charcoal moistened with water. This ought to bring the glycerine to the specific gravity 20° to 22° Beaume. If needful it is passed over a second filter. When the carbon is no longer sufficiently active it is washed with boiling water, and if needful re-ignited. The expense of purification does not exceed three francs per kilo.—*Iron.*

789. ENGLISH PATENT FOR GAS-LAMP BLOWPIPE APPARATUS.—John Robert Harper, Clerkenwell, Middlesex. November 1, 1872—No. 3233.—The first part of these improvements consists in so constructing and regulating the aperture or apertures of the jet-pipe or burner as to admit of benzoline, paraffine, naphtha, or other analogous oils or spirits being employed for generating gas under pressure in the oil or spirit vessels of gas-lamp blowpipe apparatus. Another part of these improvements consists in applying two or more jet-pipes to such apparatus, and also in attaching the jet-pipes to the oil or spirit vessel of gas blowpipe apparatus by means of a gas union joint or otherwise. Another part of this invention relates to the application of an improved arrangement or construction of safety-valve to the oil or spirit vessels of gas blowpipe apparatus. Another part of this invention relates to an improved construction of the wick tubes or holders of spirit lamps of all kinds for the purpose of preventing the transmission of heat from the flame to the oil or spirit in the reservoir. Another part of these improvements consists in securing the spirit lamp in the case or frame below the oil or spirit vessel by means of a self-acting locking contrivance, which holds the lamp firmly in position. Another part of these improvements consists in so arranging the vessel in which the gas is generated, and the lamp through which the jet is directed, that the flame may impinge and act upon a horizontal surface either above or below the apparatus. Another part of these improvements in gas lamp blowpipe apparatus consists in arranging and mounting a series of such separate lamp apparatus in a case or frame for directing a number of gas-jets upon an extensive surface required to be thus acted upon.

790. RULES FOR TESTING AND PURIFYING WATER.—According to the *Jersey City Times*, the New York Board of Health gives the following rules for testing and disinfection of impure drinking water:

To test for organic impurities in drinking water make a solution of chemically pure permanganate of potash, eight grains to one ounce of distilled water. Into half pint of the impure or suspected water in a goblet or tumbler, put one drop of the red solution; if the red tint disappears from the glassful in half an hour, add more of the solution. For every drop that loses its color in the half pint there will be found to be from one and a half to two grains of putrid organic matter in the gallon of water.

To purify such water, if it must be used, drop in the permanganate solution until a slightly perceptible red tint remains in the water. This very weak solution of permanganate is not unwholesome, but for common purposes and among the poor it is better to depend upon the thorough boiling of impure water, if such water must be used. The permanganate quickly tests the presence of organic impurities. It destroys them by instantly oxidyzing or burning them.

A very simple plan for removing some of the impurities is to pour water from one tumbler to another several times before drinking, as that will aerate it, and the oxygen absorbs the impurity.

[The Editor of this Journal must advise that no trust be put in this paragraph, whether really emanating from the N. Y. Board of Health or not. The idea, especially, that a transient aeration of the water just before drinking could have any appreciable effect, is entirely inadmissible. As the writer has recently shown, oxygen in water destroys the putrid matters by the process of *nitrification*, a process which occupies *time*. The next Excerpt on our list is referred to by him as a proof of the appreciation of this time-element by *other* chemists.—H. W.]

NITRIFICATION OF HUMUS.—J. Boussingault.—The author calls attention to the spontaneous formation of saltpetre in many parts of Algeria, Spain, Hindostan, South America, and other localities. The chief portion of this memoir is, however, devoted to the discussion of the origin and mode of formation of the saltpetre in arable soil, and more particularly in soil containing decaying organic matter. From the author's researches, it appears (1) that nitrification, even under the most favorable circumstaness, is a slow process; (2) that in the nitrification of humus, when proceeding in a confined space (under a bell-jar, for instance), the nitrogen of the air does not contribute to the formation of nitric acid; (3) that, as a rule, the process depends upon the organic matter present in the humus, and in all fertile soil, but is promoted by the presence of certain bases.—*An. der Ch. Ph.*

The New Water Tunnel at Chicago.

Our readers will remember that the city of Chicago is supplied with fresh water by means of a tunnel, built under the bottom of Lake Michigan and extending out under the lake, two miles from the shore, being then pumped and distributed through the city. Its capacity is only 54,000,000 gallons a day a quantity insufficient for the rapidly growing demands of Chicago. Contracts for another tunnel have been accordingly made, and this new work is now in process of construction. The new tunnel will be seven feet in diameter and six miles long, of which two miles will be under the lake and four miles under the city. A correspondent of the New York *Times* says that "the laborers on the shore end have progressed some 2,000 feet out under the lake, while from the crib end another body of men are working steadily forward to meet them. The limited diameter of the bore renders it impossible for many to work at once, but they are at it night and day, averaging at end a progress of perhaps twelve feet in twenty-four hours. The masons keep as close behind the diggers as possible. The soil penetrated is a hard blue clay, and such a thing as a caving in has not happened so far. A tin tube eight inches in diameter, is constantly advanced with the workmen, thus furnishing a circulation which prevents the accumulation of foul air. It is hung in the top of the tunnel, and, when necessary, is worked with a fan at the outer end. This new tunnel runs parallel with the old one, distant from it about fifty feet. It enters the same crib, and strikes the shore at the same water works, but will deliver its supply at the new works, at the corner of Ashland and Blue Island avenues, three and five-sixths miles from the old ones; and to reach it the new tunnel is to be extended under the city, river, large business houses and all. It is estimated that the cost will be somewhere in the neighborhood of $1,000,000.

From the tunnel there are to be nine or more shafts reaching to the surface of the ground for fire purposes. The water, of course, will rise in them to the level of the lake, and, should the pumping works give out, will be easily accessible to the engines. This land tunnel, as well as its lake connection, is to have a vertical diameter in the clear of seven feet and two inches, and a horizontal diameter of seven feet. Its capacity will be over 100,000,000 gallons per day. It will be lined with heavy masonry, a foot thick, and of the best materials. January 1, 1875, is specified as the date of its completion.—*Sci. Am.*

A Paterfamilias thinks he will have his newborn daughter christened Glycerine. He says it will be easy to prefix Nitro to it when she grows up, if she should take after her mother, who is always blowing up everybody.

Recent Inventions in the Manufacture of Gas in England.

The past year has been fruitful in the production of new gas schemes, and it is much to be regretted that the majority have proved so unproductive in practical results. The cause of this activity may, in a great measure, be traced to the increased price of coal and labor, which, while rendering the manufacture of gas by the ordinary method more expensive, has afforded rival schemes more chance of successful competition, and given the impetus to the present movement. The introduction, in the early part of last year, of Doctor Eveleigh's process, by the Patent Gas Company, seems to have turned the attention of inventors to the domain of gas manufacture, at the same time that it awakened public interest, and offered opportunities for speculation. The rapidity with which all the available shares in new gas companies are purchased, shows that this interest has not been damped by the want of success which has attended several of these projects, and which must have caused a considerable amount of pecuniary loss.

A short review of the most important of these inventions may, perhaps, be interesting to our readers —commencing with the Patent Gas Company (Dr. Eveleigh's process), the earliest in the field, and followed in chronological succession by The Gas Generator Company (Porter & Lane's patent), the Air Gas, and the New Gas.

Dr. Eveleigh's invention which, some time since, attracted so much attention, has been the subject of the most rigorous investigation at the hands of Mr. Keates and Dr. Odling, and their report is most exhaustive and interesting. The process consists in the distillation of coal in iron retorts of double the ordinary capacity at a lower temperature than that usually employed. A smaller yield of gas is thus procured of comparatively high lighting power, together with a certain quantity of oily tar, which is subsequently submitted to destructive distillation in a peculiarly constructed apparatus, in which the oil suffers a partial conversion into permanent gas. These two processes are, in practice, carried on simultaneously, the resulting gases mixing during their passage to the holder. The combined result of the distillation of the coal and oil by this method gives a larger yield of gas per ton of coal, it is of considerably higher lighting power, and is comparatively free from sulphur compounds.

The apparatus used for the distillation of the oil consists of three vessels placed at increasing distances from the source of heat. The oil flows into that having the lowest temperature (about 900 F.), where the fixed portion of the oil remains as pitch, while the more volatile vapor, after becoming further heated by passing through the second chamber, enters the last or hottest vessel. This is an iron pan filled with charcoal, and heated to about 1300° Fahr. The highly heated vapor of the oil, during its passage through the incandescent charcoal, is partially converted into permanent gas. This gas, after leaving the oil-still, enters a tank containing a little water, through which it passes, in order to condense any undecomposed oil; it is then conducted along a pipe, where it meets with the gas from the coal, the mixture going through the purifiers to the holder in the usual way.

The highest yield of gas obtained by this method from ordinary Norfolk Silkstone coal, during the experiments of Mr. Keates and Dr. Odling, was 10,500 cubic feet of 25 candle gas to the ton, the sulphur being as low as six grains per 100 cubic feet. This is certainly a striking result, as compared with the ordinary yield of the same coal, which is about 9300 feet of 14 candle gas, frequently containing over 30 grains of sulphur per 100 feet.

Although it has been proved possible to obtain the above favorable result by Dr. Eveleigh's process, it is to be feared that the extra amount of plant, labor, and fuel required necessitates such increased expenditure as to more than compensate for the increased yield.

Messrs. Porter and Lane's invention, introduced to public notice by the Gas Generator Company, consists in the employment of a vertical retort containing a revolving screw. Coal in small pieces is supplied from a hopper at the top, and is carried, by the action of the screw, in a continuous stream against the heated sides of the retort, by which means the coal is so rapidly carbonized that it falls out of the bottom as coke. The process is to a great extent continuous, and the rapidity with which the coal is carbonised ensures its comparative freedom from sulphur compounds, at the same time the yield of gas being greater in quantity and of slightly higher lighting power than when it is obtained by the present method. The principle of this process is excellent, and is, in fact, that recognized by most gas authorities, viz., that the more rapidly the coal can be efficiently carbonised, the purer and better will be the gas produced. Any process which tends to ensure this end will be readily adopted. The coke produced by this method is stated to be friable, and of less than average quality. The greatest impediment to the successful carrying out of this invention appears to be the difficulty experienced in preventing the revolving screw from becoming twisted, or even broken, by working at the high temperature to which it is necessarily subjected. The resistance offered by the coal to the free revolution of the screw must be considerable, and this appears to present an almost irremediable impediment to the continuous working of the apparatus. Experiments are now in progress to overcome this mechanical difficulty, and it is to be hoped that they will be attended with success.

We now come to the "Air Gas," patented by the Messrs. Horton. This process is very simple, and consists merely in drawing air through light petroleum spirit, the air thereby becoming so charged with the inflammable vapor of the spirit, as to burn with a brilliant light. It is stated by the inventors (although previous experience leads to a contrary belief), that the mixture of air and vaporised spirit is perfectly permanent, and can be stored in holders, or passed through indefinite lengths of pipe, at varying temperatures, without suffering any condensation or diminution of lighting power. This statement is somewhat difficult in belief, as the gas produced by this process is a purely mechanical mixture, not the least combination (in a chemical sense) taking place, and there is every reason to believe that variations of temperature, such as must necessarily occur in the ordinary distribution of such a gas, would cause a partial deposition of the petroleum spirit, and consequently much loss of illuminating power. On the other hand, one obvious advantage, is the immense saving of plant, fuel, and labor attendant on the adoption of this invention, together with the entire freedom of the gas from impurities. The company are, however, testing to some extent the efficacy of their process on a practical scale, by lighting one side of the Crystal Palace; any defects inherent to the system should thus become apparent, and we shall be better able to judge of its efficacy, after being submitted to the test of experience. The last invention which bears on this subject. is that patented by Mr. Ruck, and known as the "New Gas," although it may be remarked that its novelty is somewhat questionable. This gas is produced by passing steam over heated iron and coke contained in retorts, Here certain chemical changes occur, the iron acts by seizing on the oxygen of the water vapor, and liberating the hydrogen; the carbon of the coke also acts in a similar manner, producing hydrogen, together with carbonic acid and carbonic oxide, the relative proportions of which being probably variable. Of these two last named gases, the latter alone is useful, the carbonic acid increasing the cost of purification, in proportion to its quantity.

The gas thus produced possesses great heating power, but is perfectly non-luminous, and in order to adapt it for purposes of illumination it is passed through petroleum spirit, taking up sufficient petroleum vapor in the process to afford a brilliant light, its volume being at the same time increased. It is also part of the company's project to supply the non-luminous gas for heating purposes distinctly separate from that for illumination. Whether this end is to be attained by a separate system of mains, or by supplying the consumer with carburetters, is not stated.

The remarks made on the "Air Gas" apply equally to the "New Gas," but there is one point about the latter which claims special attention, which is the amount of carbonic oxide present. This is an extremely poisonous gas, very fatal, even in moderate proportion, to animal life, and as the "New Gas" cannot possess much odor, it is not unreasonable to assume that a considerable leakage might occur before being discovered. It is impossible (taking an extreme view) to draw any limit to such a disaster, or to the sacrifice of human life which might possibly take place under such circumstances. With regard to the permanency of the "New Gas," it is stated by the company to have been subjected to the most rigorous tests in order to ascertain whether any separation of the petroleum vapor would occur—it having been passed through lengths of pipe at a freezing temperature without suffering any deterioration of lighting power. This is, if true, a somewhat curious result, as even ordinary coal gas subjected to such a test suffers considerably.

It would be very desirable to have the results stated to have been obtained, by both this company and the "Air Gas" company, confirmed by impartial investigation at the hands of eminent scientific authorities who have had experience in gas matters, this being the only way to ensure the highest degree of public confidence in a new scheme.

There is still one invention which, although neither very recent, nor coming strictly under our heading, demands a few remarks as being proposed as a substitute for gas. We allude to the system proposed by Mr. Silber. This gentleman purposes utilising the heavier portions of paraffine oil, which have not previously been found suitable for illumination, and which can be obtained at a comparatively moderate cost. He effects the combustion in specially constructed lamps which he has contrived for the purpose, and the result is a very brilliant light.

The system he proposes is to distribute oil over a house by pipes, in a similar way to supplying gas, the oil being contained in a reservoir placed at the top of the house. His method, as applied to lighting railway carriages, each lamp having a separate reservoir, appears to have met with success, but the larger scheme of extensive distribution over large houses is open to many objections, and will never, probably, be generally adopted. It cannot possibly compete with gas in the matter of economy, while it is next to impossible to render joints of pipes quite impervious to oil, so that leakage must occur, causing both danger and inconvenience.

Cheap gas is generally acknowledged to be a great want, and one that, if supplied, would in all probability revolutionize our present methods of cooking and heating. Although gas is already much used for these purposes, its application is as yet limited, and perhaps it is not assuming too much to state that the use of gas for other purposes than illumination will never become general until it is, by improved methods of manufacture, much reduced in price below that which is at present charged. It is to be hoped that the recent introduction of so many new processes in connection with gas manufacture, which have, at the utmost, but partially fulfilled the necessary requirements, will not so shake the public confidence that when a really authentic gas scheme is introduced, it will fall to the ground for want of the necessary support.—*Iron.*

The Kromschroeder Gas.

The pretty little town of Great Marlow, Buckinghamshire, has for the past three months been the scene of occasional experiments with another "new gas," and on Saturday night last was actually lighted up with a gas which was not coal gas, but of which common air formed the main constituent. To all appearance the streets were lighted as well as usual, and there was nothing to indicate that the lamps were not fed with coal gas. Mr. J. F. G. Kromschroeder has spent nearly fourteen years in the endeavor to effect the mixture of common air with hydrocarbonous vapors, so as to produce an "air gas" suitable for the illumination of small towns or dwelling-houses. He claims now to have succeeded in his design, and he is probably the first man who has lighted a whole town upon a system of gas illumination which excludes the use of coal—no unimportant thing at present prices. Twelve months ago Mr. Kromschroeder applied his method to lighting the Battersea Waterworks, and for five months he kept 104 burners supplied at a cost below that of ordinary gas. Further, a quantity of his hydrocarbonised air was there stored over water for nearly four months, and at the end of that time it was said to be a far better illuminator than when first prepared.

On Saturday last a number of gentlemen interested

in gas matters assembled at Great Marlow, on the invitation of Mr. W. F. Bruff, C. E., Mr. Kromschroeder's engineer, to inspect the manufacture, storage, and application of the new illuminating material. The generator is a kind of box, of sheet iron, in bulk not exceeding two cubic yards, standing upon a shallower box, holding a liquid hydrocarbon A small dome on the upper surface covers an ingenious air or force-pump, moved by clockwork, and capable of easy regulation. The liberation of a weight starts the operation, and a steady current of air is driven over the surface of the liquid in the receiver, which is kept at a constant level. An absorbent substance is employed to increase the evaporative surface, and to oppose a slight obstacle to the passage of the current, since it is found that, within certain limits, the slowest stream of air takes up the largest amount of combustible vapor. The hydrocarbon employed is a petroleum or shale oil of specific gravity ·660, somewhat similar, we believe, to the cheap spirit burned in common sponge lamps. Seventy cubic feet of air, after complete saturation with the vapor, become a hundred cubic feet of "gas," of a density of 1·2, air itself being unity. The Kromschroeder gas is thus about double the density of coal gas, and contains nearly one-third its bulk of hydrocarbon vapor. As to illuminating power, the trial by Bunsen's photometer proved very satisfactory. Burning at the rate of 3½ cubic feet per hour, Sugg's improved argand being employed, a light equal to 18·1 candles, was indicated, which, reduced to the standard of five feet per hour, is equal to about 26 candles, or nearly double the value of gas as usually burned.

Granting an equality of lighting power, there are three points in which any proposed substitute for coal gas must satisfy consumers before it can come into use. First, its cost must not be greater; secondly, it must bear storage; thirdly, it must "travel." With regard to the first condition, Mr. Kromschroeder makes no definite promises, but is confident that his gas can be generated more cheaply than coal gas. Certainly the process is much less troublesome, and as the machine is self-acting, there can be but little expense for wages. One gallon of petroleum, worth about eighteen pence, will make about 700 cubic feet of gas, and this is alleged to burn as long as 1200 feet of ordinary gas, giving a better light. As to storage and travelling power, Mr. Hastings, engineer at the Marlow gas works, having had full opportunity for three months of testing the gas in every possible way, and having, to begin with, a prejudice against it, reports favorably. In fact, he says that storage for a week or ten days improves the gas, his theory being that a chemioal union takes place between its constituents. We could not, however, learn that the results of chemical examination confirmed this supposition. Mr. Hastings, we understood, mixes the new gas with the coal gas supplied to the town in order to raise its light-giving power. The mains in the streets are nearly five miles in length, and the gas is said to bear travelling through this length of pipe very well. A considerable amount of cold is of course produced in the generator by the evaporation of spirit, but it does not follow that the farther cooling of the gas will not condense some of the hydrocarbonous vapor. Farther experience, therefore, is desirable to fully settle this point, though the home manufacture of gas in factories and large houses is a part of the inventor's scheme which does not entirely depend for success upon the power of the gas to travel. The "Complete Angler," a mile and a quarter from the works, was lighted up during dinner by coal gas and Kromschroeder gas in turns, and the greater brilliancy of the latter was thus rendered strikingly evident, even after at least two miles' conveyance, and in spite of a defect of pressure, arising from the hotel being at a "dead end."

The inventor, very wisely, does not claim to be able to supersede coal gas in large towns and cities. He reckons that it may usefully and cheaply be applied to small towns consuming about a milllion cubic feet per annum, a consumption which would hardly justify the expense of erecting coal-gas works. The Great Marlow experiments have confirmed the confidence of himself and his co-workers in his system, and we believe they are at once about to take steps to bring the matter more prominently before the public.—*Iron.*

Supreme Court of the State of Louisiana.

THE STATE *ex.* NEW ORLEANS GAS-LIGHT COMPANY.—No. 4363.

Appeal from the Eighth District Court, parish of Orleans.

Mr. Justice Morgan delivered the opinion of the Court, in the words and figures following, to wit:

On the 1st of March, 1860, the General Assembly of Louisiana passed an act entitled "An act to extend the area of gas-lighting in the city of New Orleans, and to reduce the price now paid by gas consumers."

The first section of the act provides "That the charter of the New Orleans Gas-Light Company, as now established by law, shall remain in full force and effect until the 1st day of April, 1895; provided, that nothing in this act shall be construed so as to continue the exclusive privilege granted to said company, beyond the period fixed by its present act of incorporation, etc."

This suit was instituted against the company by the Attorney General, under a resolution of the House of Representatives, to declare the act aforesaid, in so far as it extends the chartered privileges and charter of the company beyond the term limited by the act of the General Assembly of the year 1845 (which provides that the charter of the company shall expire on the 1st day of April, 1875), unconstitutional, null and void. The ground upon which this demand rests is, that the title of the act in question violates the 115th article of the constitution in force when the act was passed, which provided that every law shall express its object in its title. It is alleged that the object of the law approved on the 1st March, 1860, is not expressed in its title.

The defendant excepts to the action upon the following grounds:

1. That the suit was instituted without authority of aw; that the Attorney General is not authorized to institute a suit of his own motion, and without legislative instruction to have the courts declare an act of the Legislature unconstitutional, especially when the decree prayed for is merely a declaratory decree, without application to any specific act or alleged wrong done under the alleged unconstitutional act.

2. That the suit is premature, because it is an effort to make the courts declare in advance, that the defendant after the year 1875 shall not be permitted to exercise the privileges of a corporation: that it is not alleged that its present exercise of privileges is illegal, and that the suit is, therefore, not maintainable, if at all, until the alleged date of the expiration of its privileges, to wit, the 1st April, 1875; and,

3. That the petition discloses no cause of action whatever, nor a case of which the court has jurisdiction.

Conceding that the Attorney General has the right to institute a suit against a corporation to annul its charter, or to declare a law under which a corporation may be acting, unconstitutional, on his own motion; conceding that whereas by the constitution and laws of the State, the Attorney General is obliged to give his professional services to either branch of the Legislature in matters concerning them, he can be called upon by one house without the concurrence of the other, to institute proceedings to cause an act passed by both to be declared by the courts unconstitutional; upon neither of which propositions do we find it necessary to express an opinion; still, it is clear to our minds that this suit is premature.

This is not a suit to annul the charter of the gas company because of its having violated any of the rights, privileges or obligations conferred upon it by the act incorporating it.

No one complains of the company, and it is not averred that it is exercising any right, that it claims any privilege, or that it interferes with any of the rights of others, in virtue of the act which we are asked to declare unconstitutional. When this happens it will be time enough for us to pass upon the question. Perhaps it may never happen. The gas company may have ceased to exist before 1875, the date on which its charter, as alleged, expires; or, if it exists, it may not desire to vend gas at that time.

If this should happen, or if, from any cause, they should cease to supply the city and its citizens, and the State, the city, or any of its citizens, should endeavor to enforce what either of them may consider a contract between the company and the State, the constitutionality of the act of 1860 might possibly be invoked. Or, if in 1875, the company should continue its functions, and the State should attempt to prohibit it from doing so; or if at that period, any citizen or party interested should resist its pretension, or should proceed against it for an infringement of his or their rights, and the company should set up the act in question in their defense, then the constitutionality of the law under which it will be acting may be inquired into.

All this will be time enough when the case arises, but no such case is now before us.

We are called upon to declare, theoretically, that a law is unconstitutional, when no one is claiming to exercise any rights under it, and when no one is complaining that it is making them any injury.

It is our duty to declare an act of the General Assembly unconstitutional when the exigencies of the case require it, as delicate as the performance of this duty may be, but we do not think we should create the exigency. We have only to deal with the practical affairs of life; we have no warrant for expressing an opinion upon rights and duties which may or may not exist in the future; much less do we feel ourselves authorized to declare an act of a coordinate branch of the government unconstitutional, when the act complained of is not only not alleged to be interfering with the exercise of any person's rights, but is not even in operation.

We think the exception to the pre-maturity of the action should have been maintained.

It is therefore ordained, adjudged and decreed that the judgment of the District Court be avoided, annulled and reversed; that the exception of the defendant as to the prematurity of the suit be maintained, and that the suit be dismissed, plaintiffs to pay the costs. —*N. O. Picayune.*

Further Developments of the Brooklyn Gas Problem.

The Special Committee of the Common Council, appointed some weeks since on motion of Alderman Taylor, to consider the feasibility of the city manufacturing its own gas, met on 12th June, Alderman Taylor in the chair.

A large number of gas men and others interested were present.

C. H. Stoddard, Secretary and Treasurer of the Metropolitan Gas-Light Company, was first examined and stated that his company had purchased from the Citizens' Company forty miles of mains, with the right to supply certain districts, for the snm of $400,000. Of this amount one half was paid in cash, and one half in bonds, the letter being still in the hands of the Citizens' Company. The Metropolitan Company at present supply 1,900 street lamps, and will be able to manufacture their own gas by the first of next November.

Mr. Havens, Superintendent of the Brooklyn Gas Company, was next questioned by the chairman. He said that he had sixteen years experience in his present business. When his company was first organized they supplied the whole city of Brooklyn proper. The gas supplied by them is from 15 to 16 candle power. In cold weather it is not more than about 14 candle power. The minimum expense of making gas, exclusive of the works, would be considerably over $2 per thousand feet. There is always a shrinkage in the quantity delivered in the mains—say 15 per cent. in some cases.

Daniel Willets, Vice-President of the Williamsburgh Gas-Light Company, stated that the capital of his company is $1,000,000. It was increased twice. The company issued scrip twice, namely in 1868 and 1869

—25 per cent. each time. The $1,000,000 was raised by the company to extend their mains. The scrip dividends were issued in consequence of the advance in their real estate, which is worth at present $600,000. Recently the company purchased some more. Five years ago they gave $50,000 for the Greenpoint Company's district. The charge to private consumers is $3 per thousand feet, and $2.50 to the city. The cost of making gas depends on the price of labor and coal. Last year gas manufactured cost the company $1.25 per thousand.

Mr. Morgan, President of the Nassau Gas Company, said his company was organized in June, 1870. They purchased a portion of the old Brooklyn District, and commenced work on the 29th of May last. They paid $4,000,000 for the district purchased, exclusive of the buildings. The district is between Washington and De Kalb avenues, Broadway and the city line. The works cost $500,000 more. The company use coal in the manufacture of gas. He considered the naphtha process of making gas very dangerous, but it makes a rich gas. The company charges $3 to private individuals for gas.

At the conclusion of Mr. Morgan's testimony the committee adjourned.—*Brooklyn Times.*

Gas-Stoking by Machinery.

At the meeting of the Society of Engineers on Monday (Mr. Jabez Church, President, in the chair), a paper on charging and drawing gas retorts by machinery, was read by Mr. J. Somerville, of Dublin. The author first referred to the necessity that existed for the adoption of machinery in this respect, on account of the exhausting and demoralizing nature of the work of gas stoking, and also in consequence of the strikes amongst gas stokers, of which the recent strike in London was a notable example. The first attempt at mechanical charging was made by Clegg, who had fed coal dust on to an endless iron web revolving through the retort. This method was tried but proved a failure.

Brunton, in 1840, endeavored to carry out the same principle, but being defective failure again resulted. The first attempt at direct steam stoking was made by Michael, who used an apparatus running on rails in front of the retorts. Coal was fed into the retorts at the top from wagons running on overhead ways, and the coke was pushed out at the opposite ends of the retorts. The arrangement, however, was cumbrous, and did not come into practice.

Mr. Green, of the Preston Gas Works, has the credit of being the pioneer in mechanical stoking, inasmuch as the apparatus designed by him (but which was not carried out in practice) has served as a model upon which all subsequent machines have been based. The Best and Holden machine, next described by the author, was first tried at the Horseferry Works of the Chartered Gas Company. In 1867, on account of strikes, it was introduced into the Alliance Gas Works, Dublin, of which Mr. Somerville is the engineer. By it the retorts were charged and drawn at the rate of sixty per hour, or three times as quick as by manual labor. Mr. Holden has since introduced a new feature into this machine at the Beckton Gas Works, where it is worked by an endless wire rope and a stationary engine. Dunbar and Nicholson's machine was then described, the author stating that it had been tried in London, but had not been adopted; it was complicated in its construction. Working Best and Holden's machine at his gas works gave the author an opportunity of seeing its defects. He, therefore, designed another machine embodying improvements upon the other. He uses two separate machines, one for drawing and another for charging, the retorts being served at both ends, and the machines following each other up in their work. The author gave the results of working by these machines, which showed that the cost of carbonising coal was 6d. per ton with the machines, and 1s. 1½d. by manual labor. This was taking the price of labor in Dublin, but by adapting London rates of wages in the calculation the saving effected would be much greater.—*London Mining Journal.*

Coal and Oil Discoveries.

MINES AND WELLS TO BE OPENED IN PERU—ENGINEERS GOING FROM NEW YORK.

During the past few months the coal and petroleum question has formed an important subject to capitalists and the government of Peru, it having been discovered that there are beds of coal of the best quality in the Sumbay district, which border on the Puno Railway. The Peruvian government ordered an investigation to be made by practical engineers, and from the reports delivered no room can exist for doubting that coal exists there in lar ge quantities

Mr. H. C. Gregory, chief engineer employed by the government of Peru, is now visiting this city on matters of business connected with this discovery. Mr. Gregory says that a large quantity of coal and petroleum has been found during the past nine months adjacent to the Puno Railway, extending some 12 miles to the southwest. Consequently great activity now exists on the part of the Peruvian government not only, but also of large private speculators who have entered upon the new enterprise. The government, in order to complete the railway from Arequipa to the head of the Amazon, had commissioned one of its officials to proceed to Europe for the purpose of raising a loan of £35,000,000 sterling, to be expended upon the railways now being constructed, and other public works.

Mr. Henry C. Meiggs and several bankers have contributed very largely to this loan. Mr. Meiggs is the leading light in the new discovery of coal and oil, and is termed the Railroad King in Peru. Mr. Gregory says that about ninety miles of the Arequipa and Puno Railway are completed, and the tunnelling of the Andes, which is about 15,000 feet above the level of the sea, is proceeding successfully, and will be completed in about ten months. When this line is completed there will be steam navigation connecting with the head of the Amazon, which will greatly facilitate the commercial progress of the country, and give a clear opening for South American trade. The coal which has been recently discovered is found in the upper portion of the Andes, between 14,000 and 15,000 feet above the level of the sea. Here oil has also been discovered in large quantities, one well worked by Mr. Thorne yielding 200 barrels daily.

At Lima and other places where the principal workshops and forges are erected, great inconvenience has been experienced, owing to the hitherto short supply of coal sent from England, thus compelling the gas companies to manufacture on a low scale. Much joy exists, therefore, in reference to the new discovery, both of coal and petroleum, as any quantity of gas can be made from the latter. A large number of workmen are to be engaged in these regions, and several practical engineers will shortly leave this city to superintend the working of the wells and coal veins.

In addition to these facts, the writer ascertained that the government has decided to open a number of the silver mines which were opened 150 years ago, but were closed owing to the great rising of water. Now that proper pumping machinery is to be obtained, little difficulty is expected to arise in preparing the most important of these mines for immediate use, and it is anticipated that the yield of silver will be very large. Mr. Gregory also says that a number of companies have recently been started for working coal and silver mines, grants of land having been obtained from the government at large royalties.

The principal coal company is that known as the Sumbay Coal Company, having a capital of $2,000,000 and owning a large quantity of land, which, from the surveyor's report, is stocked with an abundant supply of excellent coal. The petroleum is to undergo a new process of distillation, and will be principally used for making gas, and the smelting of ore in Chili, as well as Callao and Panama. Mr. Gregory says he believes untold riches are to be unearthed in this country, and predicts that it will soon be the most important of the age in the above respects.—*N. Y. World.*

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

☞ Notice.—Correspondents not intending their letters for publication must mark them "Private."

Mr. Smedberg Comes to the Rescue.

San Francisco, Cal., June 3, 1873.

Prof. Henry Wurtz,

Sec'y Gas-Light Association of the U. S.

Dear Sir: I observe by the Journal of May 2d that the Gas-Light Association pays me the compliment of selection as one of the Essayists before its October meeting; and write to say that I shall read, or cause to be read, an article upon the practical manufacture of ammonia.

I have given a great deal of attention to the subject during three years past, but have not cared to publish anything until absolutely *certain* as to the vital question of commercial profit.

That time has now arrived, and the result of my alternate mistakes and successes demonstrates the theory that every city should consume the entire product of its own gas works, and that there is a profit to the company of fifty cents upon every ton of coal it carbonizes, from ammonia, provided it selects products and modes of manufacture such as have proved successful with us. As a premise, judicious scrubbing or jet washing by a circulating flow, is of course, necessary.

You will do me a favor by mentioning the subject of my article in the Gas-Light Journal, stating that I have furnished plans already for two large ammonia works. About the market for *cheap* forms of liquor ammonia, there is no question, as every city will call for all that its gas company can turn out.

As to the question of nuisance, three-fourths of a gas company's products are made without the use of acids or the evaporating pan, and by the use of closed vessels no smell escapes to annoy the neighborhood.

I congratulate the Gas-Light Association and yourself upon their selection of secretary, and am

Yours very truly,

James R. Smedberg.

What Is It?

Galena Gas Light Company,

Galena, Ill., May 8, 4873.

Mr. Editor: In your issue of May 2nd, page 147, I find a communication without signature, headed "Removing Boiler Incrustation," recommending "Tannate of Soda."

As this is an article that I have never heard of, and none of our druggists here are acquainted with it, you will do me a favor by stating what is the "Tannate of Soda," and its value per pound or cwt.

Respectfully yours,

John Lorrain, Pres't.

[The article Mr. Lorrain refers to is unknown to us, as an article of commerce, and we must appeal to those who have introduced it as such, who are equally unknown to us.—Ed.]

Constitutional Trouble.

Toledo Gas-Light and Coke Co.,

Toledo, Ohio, June 5, 1873.

Prof. Henry Wurtz,

Sec'y Gas-Light Association.

Dear Sir: I would enquire, is the Constitution, etc., of the Gas-Light Association printed yet? If so, will you please send me a copy?

Yours respectfully,

C. R. Faben, Eng'r.

[The organization of the Association was sudden, although foreseen by us "as through a glass darkly." Very much must be done, the doing of which is scarce possible to the writer alone by himself. If Mr. Faben and other gentlemen of the fraternity who have not

made the reasonable allowances, will "possess their souls in patience" for, it may be, but a few days longer, we hope all things will "come round and be square," as one of Dickens's immortal characters has it.—ED.]

Accidents vs. Carelessness.

NEW YORK, June 28, 1873.

Mr. Editor: Last week I read in a daily paper that two brothers lost their lives at Easton, Me., by trying to descend through the man hole of a gasholder, and a third nearly lost his life through the same cause, he being dragged out more dead than alive. From the account given, it appears there must have been a positive want of caution, to say the least of it, or what is equally reprehensible, a lack of knowledge in those in charge; if so, it cannot be termed "accidental." It appears the gasholder needed repairs, and the men prepared to go inside to make the necessary repairs, and lost their lives by being suffocated with gas.

It is on this question I wish to raise a discussion, and if possible, prevent these "accidents." There is little doubt the cover of the gasholder had been removed a considerable time, and everything appeared all right, previous to the entry of the first man. The fatal result proved the terrible fallacy. In this case who is to blame? Was it an accident, or was it preventable? It might appear to those in charge to be accidental, but that does not establish the fact.

From my experience, and also from what is generally known by men who have made the science of gas-lighting a study, I think they will endorse what I say—that a gasholder (with only one man hole, and the bottom sealed with water) may be open for six months, and yet suffocate the first man that enters it. The men in this case may not have known of this fact, but the superintendent's duty required him to know it, in order as well to protect his employer's interests as those he employed. I know that many who ought to be well informed on this subject believe that if a gasholder or other apparatus is opened a certain time, that necessarily all the gas must escape into the atmosphere. Not a month ago in conversation with a man connected with a gas works in this country, he persistently argued this point with me—that all the gas contained in a vessel will leave it if an outlet is given; in one place, for instance, taking a cleaning plate from the exhauster will empty the exhauster and 24 inch pipe from the valve to the cover. Can you wonder that when men are placed in responsible positions, as this one for instance, that accidents, explosions, etc., will occur, when they are ignorant of the nature of the article they are in charge of. To such men I wish to say, that it is not possible for the gas to leave a vessel after being once filled with it, except by force. As much of it will leave as reduces the pressure to zero; below that it cannot be moved of its own volition. A familiar illustration is given by the balloon. The aeronant having once got the gas into his balloon casts off his connection from the gas works; the atmosphere closes upon the gas in the neck of his balloon, preventing any escape, and the same effect occurs in the gasholder—directly the cover is removed the atmosphere closes upon the gas and keeps it as securely in its place as if it was confined with a valve. One means to prevent such accidents occurs to me. Before pumping out the water from the tank, I would attach a pipe to the crown of the gasholder and pump the gas out, after the holder is settled down on the curb, until a slight vacuum is produced, which will directly show itself, then let in air and pump it out again until all the gas is got rid of. This may be done at a very small expense, and will prevent suffocation and explosion. Here the case differs, Again, a man can live and work in a mixture of gas and air, which from the nature of the work may blow him and the gasholder to pieces, without a moment's warning. For instance, one volume of gas mixed with eight volumes of air, makes a compound as destructive as nitroglycerine, and a spark from a steel chisel or putting in a hot rivet will explode it. This is the only way a gasholder can be exploded—when it is comparatively empty.

A correspondent of the New York *Daily Times*, in a late issue of the GAS-LIGHT JOURNAL, gives vent to another popular fallacy in reference to the late fire at Cincinnati, and its proximity to the gasholders, which he says was momentarily expected to explode. He says that although they were red hot on one side, yet they did not explode. I think this case ought to convince the public, without argument, that there is no danger of a gasholder exploding, even when red hot, if it is filled with pure gas. You may with impunity make a hole into a gasholder and apply a match and it will burn down without explosion, but if a large fracture is made in a gasholder, such as a building falling upon it, then the escaping gas is just as dangerous as if confined in a building or gasholder, if there is a fire in the immediate vicinity. It appears to form an explosive compound, and in that condition will rush for a fire and return to its point of exit, when the explosion will instantly occur with equal intensity in the open air, or in a confined space. I have known the shock of such an explosion to be distinctly felt five miles away, and to break glass in the windows two miles from the point of explosion.

Respectfully yours,
JOHN KEELING.

Gas Consumption.—At a meeting of the London Gas Consumers' Association, Mr. George Flintoff, their engineer, read the following statistics, compiled from parliamentary and other documents: Cost of gas within the limits of the metropolis in 1872, £2,354,-487; gas sold, 12,165,000,000 cubic feet; coal used, 1,615,784 tons. The lowest charge for gas was 3s. per 1000 feet, free of meter rent; the highest 4s. 6d. per 1000 feet. In the United Kingdom there were 1,360 towns lighted with gas, viz., 1,053 in England and Wales, 207 in Scotland, and 100 in Ireland; 81 gas works belonged to municipal corporations and 69 to private individuals, while only 234 are regulated by special Acts of Parliament.—*Exchange.*

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

[Reported Expressly for this Journal.]

JULY 2, 1873.

DELIVERED IN NEW YORK.

English Cannel.			
Ince Hall	$17 00	@	18 00
Kirkless Hall	16 50	@	17 00
English Caking Coals.			
Newcastle Gas	$12 00	@	00 00
Liverpool caking	11 50	@	12 00
British Province Coals.			
International—At Sydney, $2 50 in gold			— —
Block House—At Mines, $2 50, Gold			0 00
Little Glace Bay—At Mines, 2 50 Gold			— —
Pennsylvania Coals.			
Penn Gas Coal—At Amooy	$8 50	@	0 00
Westmoreland—At Amboy	8 50	@	0 00
(In New York both the above coals $9 10)			
Shafton	9 10	@	0 00
Youghiogheny—At Baltimore	7 50	@	0 00
West Virginia Coals.			
MurphyRun	$7 50	@	8 75
Despard—At Baltimore	6 30	@	0 00
West Fairmont	8 60	@	0 00
American Gas Coal	8 50	@	0 00
Fairmont	8 50	@	0 00
Newburgh Orrel	8 50	@	0 00
Pinnickinick	8 50	@	8 75
Cloverhill of Virginia	6 75	@	7 00
McKenzie Compound Mixture			— —
American Cannel Coals.			
Peytona of West Virginia	$15 50	@	00 00
Darlington of Pennsylvania			— —
American Cannel	$14 00	@	00 00
Asphalts.			
Albertite of New Brunswick	$— 00	@	— 00
Ritchie Mineral of West Virginia	20 00	at Balt'e.	
Trinidad Bitumen	— —	@	14 50

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BOWDITCH.—THE ANALYSIS, TECHNICAL VALUATION, Purification, and Use of Coal Gas, with illustrations, 8vo. cloth. Price, $4.50.

GAS-LIGHT MANUAL—Being a Treatise on the Management of Coal Gas, as applied to Domestic Purposes, etc. By John Campbell. Paper, 75 cents.

A GUIDE TO GAS-LIGHTING—By Alexandor H. Wood, A. I. C. E.; second edition. Revised and enlarged. 8vo. paper, 50 cents.

LAW OF GAS AND WATER SUPPLY—Comprising the Rights and Duties,as well of Local Authorities as of Private Companies in regard thereto. By W. H. Michael and J. Shiress Will. 1 vol. crown 8vo. cloth. $9.00.

CLEGG—Treatise on the Manufacture of Coal Gas, 5th edition, enlarged, 4to, cloth. Price, $10.50.

COLBURN—The Gas Works of London, 12mo, boards. Price, 60 cents.

GAS CONSUMERS' GUIDE—A Hand Book of Instruction on the proper management and economical use of gas, etc., etc. 12mo., cloth. Price, $1.00.

HUGHES—Gas Works and Manufacturing Coal Gas, 12mo Price, $1.20.

D'HURCOURT—De l'Eclairage du Gas. Par E. R. Hu court, 3d edition. Paris, 1863; 8vo. and plates, $6.00.

RICHARD—Gas Consumer's Guide, 12mo. Price, 50 cents

SWEET—Special Report on Coal, showing its Distribution, Classification, and Cost, delivered over different routes to various points in the State of New York, and the principal cities on the Atlantic Coast. By S. H. Sweet, with Geological Maps. 1 vol. 8vo. cloth, $3.

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WILKINS—How to Manage Gas; 24mo., paper. Price, 25c

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GAS PURIFICATION.

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NEW IRON COMPOSITION

Has purified, per bushel, on a single test, 10,000 feet of Westmoreland Gas. With revivification lasts indefinitely. Surpasses in POWER and ECONOMY all known materials. Saves largely in FIRST COST, SPACE, LABOR, SUPERINTENDENCE, and all current expenses. Will purify *easily* sulphurous gas, wholly *unmanageable by lime.* Takes out *all the ammonia.* Now operating in the following Gas Works: Harlem, New York (21st street); Port Morris; Hunter's Point; East New York Worcester, Lynn and Cambridge, Mass.; Lewiston, Maine; St, Albans, Vt.; Pawtucket, R. I.; Meriden, Ct.; and being introduced in many other places.

Cost 70 cents per bushel. One bushel for each square foot of Purifier sufficient. Rights to use for life of Patents, for daily makes of gas in thousands; under 25,000 $200; under 50,000, $400; under 100,000, $500; $250 additional for each additional 50,000 per day.

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GAS-LIGHT JOURNAL

AND

Chemical Repertory,

PUBLISHED ON THE 2D AND 16TH OF EACH MONTH,

At No. 42 Pine Street, New York.

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PROPRIETORS.

EDITOR—PROF. HENRY WURTZ.
Sec'y of the Gas-Light Association of the U.S.
Editor's Private Office, 12 Hudson Terrace, Hoboken, N. J.
(Immediately fronting the Ferry Houses.)

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☞ All communications to be addressed to "THE EDITOR, No. 42 Pine Street, Room 18, New York.

WEDNESDAY, JULY 2, 1873.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 11 and 121 Nassau street, New York agents for this Journal. News dealers will please send orders to them.

NOTICE.

☞ *All Collections for Advertisements, Subscriptions, etc., are made directly from this Office. We have Agents to solicit the same, but they are not authorized to Receipt for Money.*

TO OUR SUBSCRIBERS AND PATRONS.

In making remittances for subscriptions, always procure a draft on New York, or a POST OFFICE MONEY ORDER, if possible. Where neither of these can be procured, send the money, but always in a REGISTERED LETTER. The registration fee has been reduced to fifteen cents, and the registration system has been found by the postal authorities to be virtually an absolute protection against losses by mail. ALL Postmasters are obliged to register letters whenever requested to do so.

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FURTHER GRATUITOUS ADVERTISEMENT.

NEW YORK CITY, June 18, 1873.

Sir: In your issue of June 16 I read an article entitled "A New American Gas Engine," by which it is apparent that you feel hurt by a seeming indifference, or neglect towards your paper, on the part of those having the Brayton Engine in charge.

I am very sorry that the matter should be so regarded, as I assure you nothing could have been farther from my intention as General Agent for the owners of the invention.

I called at your office several months ago and stated that the engines were being exhibited, etc., and expressed a desire to be favored by a visit.

I was not aware that you had called until I so read in your paper. I am now informed that such is the case, and that I was abroad at the time.

I acknowledge my inadvertence in not sending Prof. Thurston's report.

I am out much of the time, but will make it convenient to be present at any hour agreeable to should you see fit to favor me with a visit.

H. M. HAMBLIN.
General Agent.

[Mr. Hamblin's letter, if intended as an apology, does not seem to meet the case. The slight to the Editor of this Journal, being a mere personal matter, is scarce worthy of consideration; but the passing by of the whole Gas-Fraternity of America, in putting forward an invention of general importance to them, without any recognition of them, and with the notion that the invention, however meritorious, could be brought into use without their help, seemed to us, to say the least, preposterous, not to say insulting. Moreover the extraordinary manner in which this whole business has been conducted could not but strike us with surprise. We recognize invention, possibly *original* invention (though this is a thing always very dubious) nevertheless *valuable* invention, and should be glad if the inventor has been rewarded. We have nothing to do with any other considerations, except such as affect the gas-manufacturing interest. But it seems to us that there are questions involved here other than those of a mere mechanical kind. Prof. Thurston's report has been received by us from Prof. Silliman, who expresses himself as "quite at a loss to understand why the promoters of the Brayton Engine should have failed to supply" us with full and early information. It is impossible to publish Prof. Thurston's very careful statement in full, as it is somewhat voluminous; but the main point is his comparison of effective power as compared with other gas-engines. The Brayton Engine, according to his specification, belongs to the genus of the old Flame-Engines, and may be called a Gas Flame-Engine. Doubtless, as we think, the general plan will be found practicable and valuable, and will come into universal use throughout the world, for small-power purposes. The main question is whether there is any material advantage in the continuous-flame action over the explosive action. We have had no opportunity to observe or to test, as regards this question, so that we are here in the dark. Prof. Thurston's comparison with Parisian experiments upon the Hugon Engine, which indicate apparently a gain of 18 per cent. of power per gas-consumption, loses its significance when we consider that he has forgotten to note that gas is a variable article, and that gas made in New York may develop in burning more *vis viva* than gas in Paris.

It might be well to recall here that the method of kindling, in the Brayton Engine, by a continuous flame, is borrowed from Hugon, but the latter inventor has adhered to the idea of *explosive* action.

In conclusion, we must say, that we should require further proof before deciding as to ihe relative merits of the two plans of explosive and gradual combustion in a cylinder for developing power from gas. In neither case is it to be expected, as appears to be maintained by some of the advocates of the Brayton machine, that *perfect* combustion will ensue, and, in point of fact, one of the most important questions is whether the combustion will be more perfect in a continuous flame or in an explosive mixture, when in a space confined by cold walls.

IMPORTANT!

CIRCULAR TO COMPANIES AND INDIVIDUALS ENGAGED IN MANUFACTURING GAS.

GAS-LIGHT ASSOCIATION OF THE UNITED STATES, SECRETARY'S OFFICE,
12 HUDSON TERRACE HOBOKEN.

Article Second of the Constitution of the Gas Light Association says:

"The members shall consist of the several regularly organized gas light companies, represented by not more than three delegates each, and of individuals engaged in supplying towns with gas; who may become members by assenting to this Constitution, and by the payment of ten dollars."

In correspondence with members of the Executive Committee, the Secretary has been advised to put this clause at once and prominently before the whole American gas fraternity, and to urge and invite that all companies and individuals thus entitled to representation should lose no time in enrolling themselves, and paying the entrance fee, through the undersigned.

There are several urgent reasons for such promptitude; one being that it is important to know, as soon as possible, how many and what companies purpose to be represented at the first annual meeting of the Association, which is to convene in New York on the 15th of October next, a meeting at which many subjects are to be discussed, and some doubtless decided, of the highest importance to the common weal of the Profession.

Another reason is that some small funds are needed to provide for the expenses of the organization of this meeting, which will be considerable, as well as for those of the Secretary's office there being no justice in permitting individuals to bear wholly (although but temporarily) a burden in which all are interested.

The Secretary therefore trusts that there will be no delay in any quarter in coming forward with the trifling entrance fee of ten dollars, which will entitle the company or individuals paying the same, to enrollment in the order of receipt of payment. HENRY WURTZ,
Secretary of the Association.

THE CONSTITUTION OF THE ASSOCIATION.

At the meeting of organization of the Gas-Light Association, a resolution was passed that the Secretary send a printed copy of the Constitution, with other necessary documents, "to all the gas companies throughout the United States." Impatience has been manifest in certain quarters, at the delay in receipt of this document. We therefore announce that it is now in press.

The delays have been due to several causes, one only of which, for the sake of saving space, will be mentioned. This is the absence of Gen' Roome, our President, who has gone, on a little jaunt, to the other side of the continent.

The Secretary has therefore the whole responsibility of the preparation for the coming meeting thrown upon himself. He does not shrink from it; the labor being nothing, though the responsibility is something. Circulars will be received in a few days by all the fraternity reachable by us.

EFFECTS OF DROUGHT AND HEAT.

Our hot and dry month of June this year has had its effect, as will be seen by reference to the paragraph below, cut from a Jersey City newspaper of June 25th:

"Large numbers of complaints from citizens are being received at the Board of Public Works on account of the bad smell from Passaic water, asking to have the hydrants blown off."

Those readers (too few, we fear) who have so far honored the Editor as to read his late report on the Water-Supply of the New Jersey cities (republished in this Journal), will recognize here a strangely sudden verification of one of the generalizations resulting from his labor. The following sentence will in fact bear repetition here:

"—when we consider that in midsummer the heat intensifies putrefaction, and that the amount of available oxygen to destroy its products is largely diminished by the enfeebled solubility of oxygen in the water, it would appear that we have a reasonable solution of the unpleasant odor and taste that the water (of the Passaic River) has of late years sometimes acquired in July."

As we have this year had our July in June, it remains to be seen what we shall have in the midsummer months, as regards both air and water.

As for the *air* this summer, in and about our rich city, it might not be ill to recall averse of a forgotten poet, Richard Corbet; fully as applicable to theAmerican metropolis of this century, as to the European of the last.

"We came to Paris on the Seine
'Tis wondrous fair, 'tis nothing clean,
'Tis Europe's greatest town:
How strong it is I need not tell it,
For all the world may easily smell it,
That walk it up and down."

And, being in a reminiscent mood, it may do to echo also, to wind up with some solemnity (as applicable to the business we began with—the Passaic water—and bearing in mind the rottenness of which said water is the sink) poor Tom Hood's wail:

"Over the brink of it,
Picture it—think of it,
Dissolute man!
Lave in it, drink of it,
Then, if you can."

"THE RHYMES OF THE UNIVERSE."

Professor Pliny Earle Chase has sent to us a series of papers containing most wonderful discussions of what he calls "Cosmical and Molecular Harmonies." These papers have been read to the American Philosophical Society, during the current year. It would be futile for us to convey to our readers in condensed form the the substance of these papers. One is entitled "The Gamuts of Sound and Light," and points out analogies between aerial and aetherial undulations, in their effects on the human ear and eye, far beyond any previous investigator. Another treats of "The Music of the Spheres," in which he searches into "the cumulative evidences of a commensurable unity of law, in atmospheric tides, gaseous explosions, sonant and luminous vibrations, molar and molecular inertia, satellite distances, solar and planetary rotation, gravitating and magnetic action."

The sentence we quote will serve to convey to the reader some feeble idea of the heighth, breadth, and depth of Prof. Chase's remarkable researches."

BOOK NOTICE.

THE COAL-REGIONS OF AMERICA, by James Macfarlane, A. M., of Towanda, Pa.; New York, D. Appleton & Co., 549 and 557 Broadway.

This work we would call our readers attention to particularly, those of them at least who have more time to read it than we; as in our own necessarily hasty skimming over of it, we recognize merits that would doubtless improve with acquaintance.

The author states in his preface that Dr. Newberry has contributed to his work personally, implying thus a much higher recommendation than anything the present writer could say. Very interesting and valuable maps, geological and orographical, accompany the work.

Iron Vessels for the transport of spirits are found to be free from many of the defects of wooden ones, especially such as cause loss. They are made of sheets less than one-tenth of an inch thick, of cylindrical form, about 47 inches long and 32 inches in diameter, with ends slightly convex. The bung is closed by rubber disks, and protected by wooden hoops on each side; there are thin iron hoops around each end, and the interior is protected from rusting by a coating of gum or dextrine.—*Iron Age.*

A NEW INVENTION FOR LIGHTING STREETS.

FROM REPORT OF
THE FRANKLIN INSTITUTE.
PHILADELPHIA, Jan. 20, 1873.

The Committee on Science and the Arts, to whom was referred for examination

Dyott's Patent Street Lamp.

Report having given it a careful amination, that they deem it to other Street Lamps in the followin particulars:

It has a *double* semitransparent top with an intervening air space, which keeps the top cool, and prevents that breakage of glass so prevalent in other Street Lamps, and by the arrangement of its drafts more complete combustion is prodnced, and a greater amount of light is obtained from a given quantity of gas. Its semitransparent Reflector transmits sufficient light to illuminate the upper portion of surrounding buildings, and reflects the light where it is wanted, around and below. It also shelters the heated glass globe from rain, hail, and snow, and prevents breakage. It is peculiarly well adapted to display Street Names. Its arrangement and facilities for cleaning are excellent. It possesses decided advantages over other Street Lamps, and its tasteful design, in connection with ts moderate cost and the durability of its construction, commend it as an article for general street and other uses.

By order of the Committee.
D. S. HOLMAN, Actuary.

THE EXPOSITION AND INDUSTRIAL FAIR OF KINGS COUNTY, N, Y.

FIRST DIPLOMA Awarded to M. B. DYOTT for Street Lamps of superior excellence, at the annual exhibition at the City of Brooklyn, N. Y., 1872.

ATLANTIC CITY, August 20, 1872.

We the undersigned, Mayor and Members of Council of Atlantic City, N. J., having had twenty of Dyott's Patent Street Lanterns in use for some months, take pleasure in saying they have given entire satisfaction. Having no doors they are not subject to exposure, are durable, beautiful and easily cleaned—are the best we have seen or used, and have no doubt they will be generally adopted, when their advantages become known to Gas Companies and City Governments.

(Signed by the Mayor and every Member of the City Council.)

We the undersigned citizens of Atlantic City, having Dyott's Patent Street Lamp at our Hotels, fully concur in the recommendation of the same by our Mayor and City Council hereto annexed.

WILLIAM G. BARTLETT,
ALBERT BROTHERS,
BARCLAY S. SMITH,
CHARLES PALMER.

For further particulars address or call on
M. B. DYOTT,
114 South Second Street,
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NEWARK GAS BURNER MAN'G CO.

Manufacturers of all the
NEW AND IMPROVED
BRASS GAS BURNERS.

The *best* Gas Burners in the World for Street Lamps; also for Portable Gas Machines, to order.

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AND
CLOVER HILL
GAS COALS.

We have made arrangements by which, for the first time the celebrated

YOUGHIOGHENY GAS COAL

will be brought to the seaboard.

It is mined on the banks of the Youghiogheny River, near Pittsburgh, and is universally acknowledged to be the BEST GAS COAL known in the world. It will be shipped East and South from

Baltimore, Alexandria, and Georgetown,

AND WEST FROM

Cleveland.

We also offer the well-known

CLOVER HILL GAS COAL,

from Virginia, shipped from

Richmond.

This Coal comes from the oldest and deepest mine in America, having been worked for fifty years, and has a wide an favorable reputation.

NICHOLSON & WELD,
111 BROADWAY, N. Y.

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Tube and Iron Co.

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Wrought Iron Pipe
For Gas, Steam, Water, Etc.

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☞ **Gas Works CASTINGS of all kinds.**
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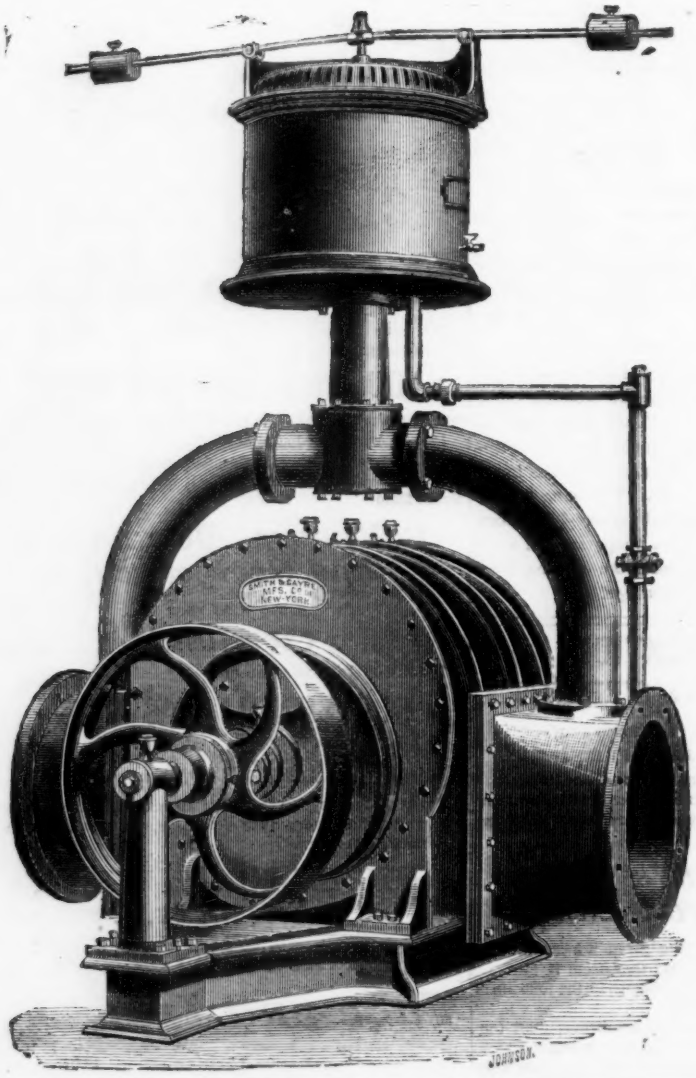
SITUATION WANTED by a competent Machinist and Gas Engineer, who has had much experience in erecting and altering Gas Works, and the Manufacture of Gas—one who is not afraid to work. No objection to a small or ordinary Works, if in a growing place. Can furnish reference as to ability, etc. Address GAS ENGINEER, Station F, New York Post Office. 335

SMITH & SAYRE MANUFACTURING COMPANY.

The Mackenzie Patent Gas Exhauster

And Patent Compensator,



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan.

The Cupolas are manufactured in sizes to melt from 1 to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent fuel. Address

G. G. PORTER, President.
JAMES M. SAYRE, Treasurer.
CHARLES W. ISRELL, Secretary.
OFFICE, 96 LIBERTY STREET, New York.

AMERICAN

GAS SCREEN MAN'F'G COMPANY.

TO GAS-LIGHT COMPANIES.

Your attention is respectfully called to the GAS SCREEN now being manufactured by the American Gas Screen Manufacturing Company, under the patents granted to E. DUFFEE, and are pleased to submit the following points of their excellence and superiority over all other screens now in use.

The Screen is made with an oak frame, interlaced with split rattan, drawn through holes at regular intervals in the Frame and cross-pieces, the edges of the frame being grooved to prevent abrasion.

The advantages of the screen are:

1st. The large purifying surface, the construction of the Screen giving over three-fourths of the surface for the gas to penetrate the lime.

2d. On account of the free passage of the gas through the Screen the pressure is reduced, thereby preventing the accumulating of carbon on the retorts.

3d. The saving of lime and labor, as the Screens are not liable to clog, and are easily cleaned.

4te Their cheapness and simplicity of construction.

5th. Their DURABILITY—they can be used longer than any other now used.

Testimonials.

PROVIDENCE, RHODE ISLAND, March 21st, 1872

E. DUFFEE, Esq., Agent, etc.

Dear Sir: The Trays manufactured by you for our West Station were put in use in September last, and have *given perfect satisfaction.*

The frames are well put together, and I see no reason why ey will not last for a long time. The *very large amount of space* in these Trays gives the gas an easy passage, and brings it into contact with the lime much better than when the space is so contracted, as is the case in most of the other Trays in use.

The pressure thrown upon the retorts by contracted passages is very great, and were gauges used more frequently than they now are in many gas-works, this facat of having *open Trays* would become more apparent to mangers of gas works. The digerence in pressure at this station in passing the gas through your purifiers, is two-tenths (2-10) inches.

The amount of gas purified, per bushel of lime used to this date, 18 six thousand five hundred and fifty six (6,556) cubic feet.

Respectfully yonrs,
JAMES H. ARMINGTON, Supt.

BOSTON GAS-LIGHT CO., Dec. 1871.

Dear Sir: In answer to your inquiry how we like your Patent Tray for dry gas purifiers, I take pleasure in saying we have used them exclusive of all others, for the last three years, and think them far ahead of any yet offered. The surface being nearly three times that of any other Tray, and their lightness and durability perfectly satisfactory.

Yours respectfully,
A. M. GILES.

EDWARD DUFFEE, Esq.

EAST BOSTON, JUNE 15, 1871.

Gentlemen: We have used your Screens some five years. They give perfect satisfaction.

I consider them *by far the best Screen* for Dry Lime Purifiers I have seen. Yours truly, A. M. NORTON, Supt.

CHELSEA, May 1, 1871.

Mr. E. DUFFEE.

We are using your Purifying Trays, and find them to be the *best of any* that I have used, and will *purify more gas with less pressure* than any tray that I know. I can fully recommend them, after four years trial, to any Gas Superintendent with perfect safety, as the *cheapest and best Tray made.*

Yours truly, JOHN ANDREW, Sup't.

DORCHESTER, March 3, 1870.

Mr. E. DUFFEE.

Dear Sir: We have had your Gas Trays in constant use for almost one year and six months and find them superior to any others we have ever used, both in point of economy and efficiency. Truly yours, W. B. BROOKS,
Agent Dorchester Gas-Light Co.

JAMAICA PLAINS, MASS., June 21, 1871.

EDWARD DUFFEE, ESQ.

Dear Sir; The Trays ordered by this company three years ago, are getting somewhat worn. I wish to say here that I consider your Trays to be superior to any yet invented, therefore please make us another set at the price named, to be like the sample shown in every way, and oblige Yours truly
JAMES F. ROGERS,
Sup't Jamaica Plains Gas-Light Co.

BROOKLINE, June 11, 1871.

E. DUFFEE, ESQ.

Dear Sir: You will please make a set of Gas Trays for this company as soon as convenient, at price named. In regard to the merits of the Tray, after having them in constant use for over two years, I will say that I consider them *superior to any Tray* manufactured in this country. Respectfully yours,
H. A. ALLYN,
Sup't Brookline Gas-Light Co.

BANGOR, August 2, 1870.

EDWARD DUFFEE, ESQ.

Dear Sir: Yours of the 20th ult. is received. In regard to your Gas Trays, I take pleasure in saying that they have been in use over two years, and have given perfect satisfaction and they are in good order at the present time; should have no hesitation in recommending them, believing they are the most durable and easiest kept in order of any with which I am acquainted. Respectfully yours,
W. H. PERRY, Sup't.

OFFICE OF THE SPRINGFIELD GAS-LIGHT CO.
SPRINGFIELD, MASS., Oct. 10, 1871.

Mr. WARD,
President Hartford Gas-Light Co.

Dear Sir: I have been using Gas Screens made by the American Gas Screen Company, for nearly a year, and find them superior in every way to the wooden Screens made and formerly used by the Springfield Gas-Light Co. I can purify more gas with the same quantity of lime, there being more surface to the Screens; and I consider them more durable. and recommend them to your consideration.

Yours with great respect,
GEORGE DWIGHT.

ROXBURY, June 14, 1872.

EDW. DUFFEE, ESQ.

Dear Sir: In answer to your inquiry regarding your Patent Gas Screens, I am happy to be able to say, that after nearly three years constant use we are perfectly satisfied with them being able to purify over fifty pet cent. more gas with them, than with any other Screen we have used.

Yours respectfully,
THOMAS J. PISHOU.

OFFICE DETROIT GAS-LIGHT CO.,
DETROIT, MICH., April 22, 1872.

AMERICAN GAS SCREEN MANUFACTURING CO., HAVERHILL.

Gentlemen: The Screens bought of you work far better than any we have ever used. As a proof, we have with the same quantity of lime purified *twenty per cent.* more gas with your Screens than with any others, and the work well done. The workmen are also better pleased with them—they being light and handy to work. They also relieve the pressure very much upon the retorts, and I cheerfully give yau my experience.

Yours truly,
P. E. DEMILL. Secretary.

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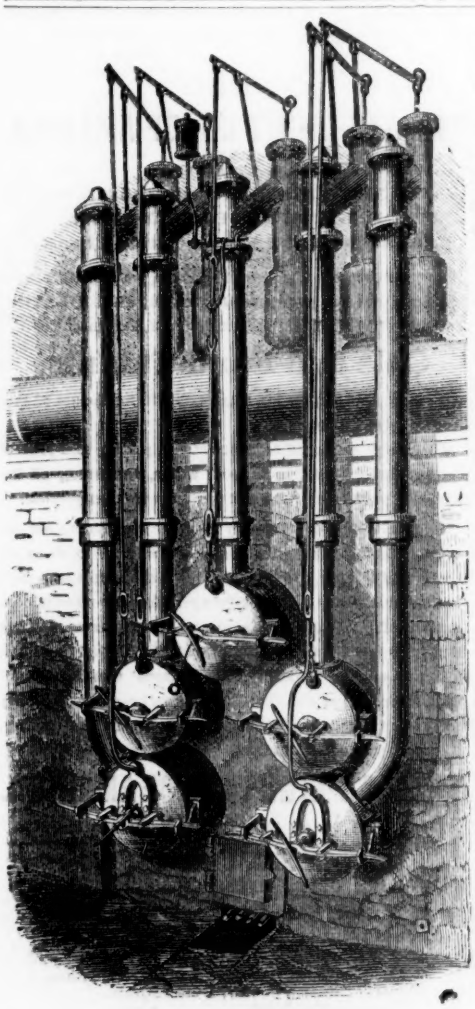

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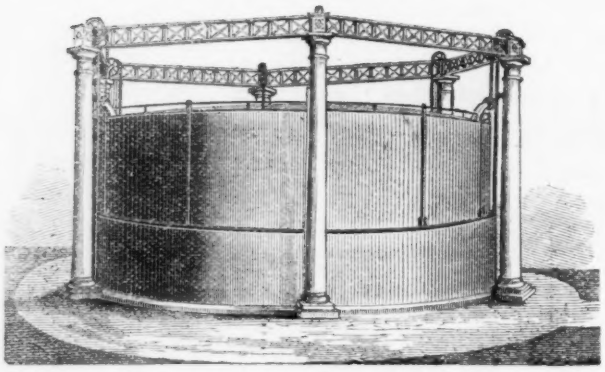

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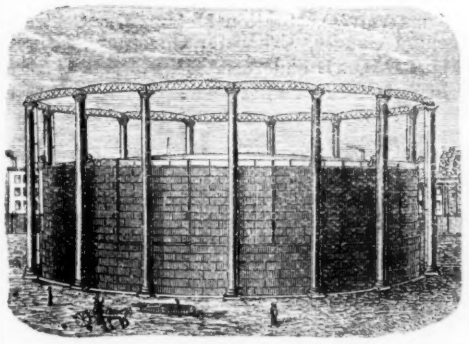

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TILES AND BLOCKS OF ALL KINDS.

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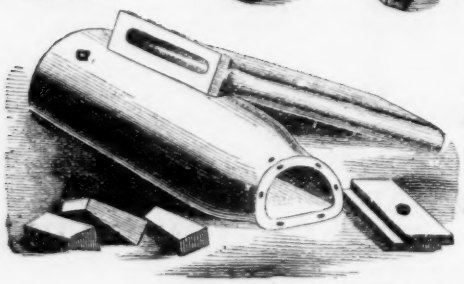
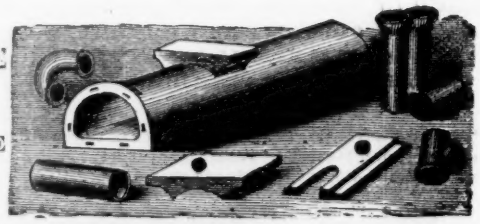
FIRE MORTAR, CLAY AND SAND.

ALL KINDS OF FIRE CLAY MATERIALS.

The Only XX Fire Brick.

☞ RETORTS OF THE VARIOUS SIZE KEPT ON HAND.





Vitrified Steam Pressed Drain and Sewer Pipe.

WILSON & GARDNER.

Works, Lockport, Westmoreland Co., Pa.

Office, 96½ Fourth Avenue, Pittsburgh, Pa., Rooms 1 and 2.

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CLAY RETORTS, FIRE BRICK, TILE, Etc.

FROM CLAY, SAME SPECIES, AND EQUAL TO

BEST BELGIAN.

☞ ORDERS PROMPTLY FILLED. IMPROVED WORKING PLANS OF THREES AND FIVES UPON APPLICATION.

REFERENCES

Gas Works Northwest, West, and South.

1849. HARRIS, GRIFFIN & CO., 1873.

12th and Brown Streets, Philadelphia, Penna.

and 49 DEY STREET, NEW YORK CITY.

Manufacturers of WET AND DRY GAS METERS, STATION METERS, SHOW AND TEST METERS, METER PROVERS, PRESSURE REGISTERS AND INDICATORS, BAR AND JET PHOTOMETERS, WET AND DRY CENTER VALVES, and all Apparatus pertaining to Gas Works in their line.

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We hereby caution all parties against making, vending, or using any GAS EXHAUST GOVERNOR that will be an encroachment of our patent.

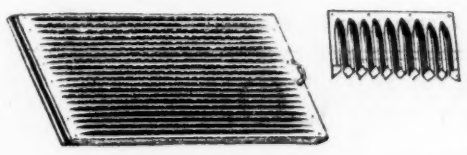
The support and confidence of Gas Companies, so long enjoyed by us, encourage us to pursue the same undeviating course that has contributed to establish the character of our house, and with our extended experience and increased facilities, develop the latest improvement that Science can apply, in the construction of Gas Meters, etc., and thereby merit a continuance of the favors hitherto so liberally extended to us, always guaranteeing satisfaction.

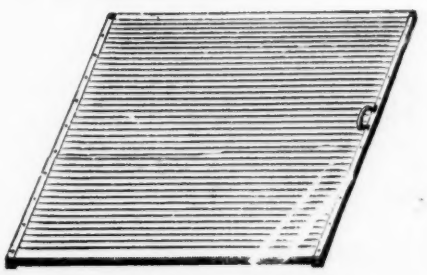
ANDREW HARRIS. JOHN J. GRIFFIN.

J. L. Cheesman,

MANUFACTURER OF

Patent Conically and Diamond Slotted Solid Wood Trays.





To Gas Companies.

The above Trays will last longer. and are cheaper than any Tray now used. They are now made without any outside strips, which gives more purifying surface, being perfectly smooth. The lime will not adhere to them as in other Trays. They are now used in over three hundred Gas Companies in he United States, and other places.

JOHN L. CHEESMAN,
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R. D. WOOD & CO.,

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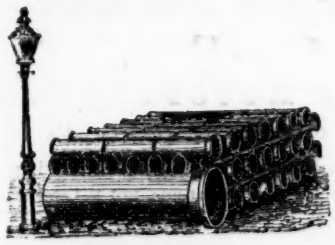
MANUFACTURERS OF

CAST IRON GAS & WATER PIPES, Matthews Patent Hydrants, Lamp Posts, Etc.



For the accommodation of parties who may want small lots Pipe for *immediate* delivery, we have established a yard in New York City.

We have on hand here several thousand feet of small Pipe. from which we can ship orders readily to any part of the country.

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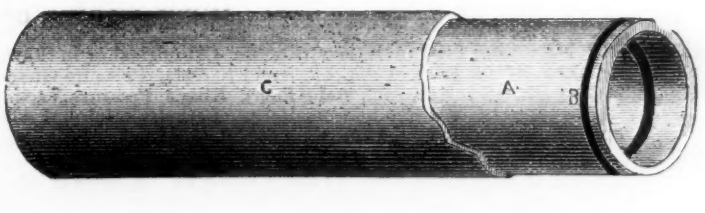
No. 173 Broadway, New York,
3-tf SECOND FLOOR.

NORTHWESTERN
GAS AND WATER PIPE COMPANY.

WORKS, AT BAY CITY, MICHIGAN.

CHICAGO OFFICE, 646 WABASH AVENUE.

SECTION OF GAS PIPE.



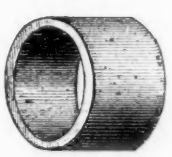


FIG. 2.

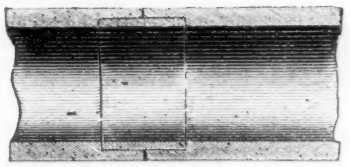


FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3.—Horizontal Section and Connection.

Above is a cut of the

"WYCKOFF PATENT IMPERISHABLE GAS PIPE,"

manufactured by the NORTHWESTERN GAS AND WATER PIPE COMPANY.

This Pipe is made of White Pine, one inch to sixteen inches bore, in sections eight feet long rounded in a lathe, coated inside and out with Asphaltum, connected with a tenon, or socket, and a thimble joint, perfectly air and water tight, being driven together with cement furnished by the Company. When laid its cost is about one half that of Iron Pipe, and is UNQUESTIONABLY the best Gas conducting Main in use.

☞ Send for Descriptive Pamphlet and Price List. 242-1y

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CONSHOCKEN, PA.,

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heavy and Light Castings of every description.
412 Walnut street, Philadelphia, Pa.

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RILEY A. BRICK & CO.,

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FOR WATER AND GAS,

ALSO,

GAS WORKS AND MACHINERY CASTINGS

OF EVERY DESCRIPTION,

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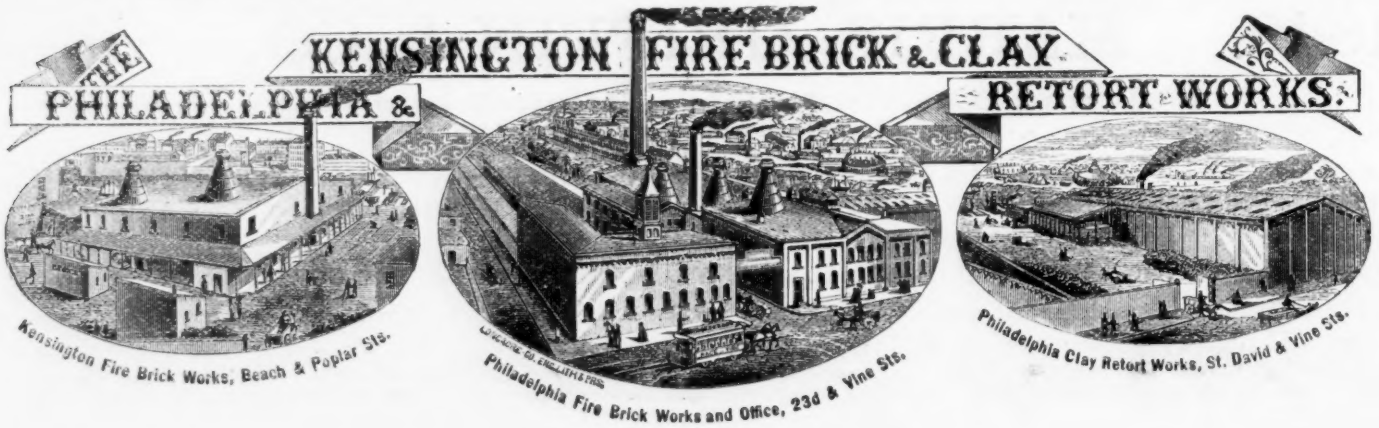
RILEY A. BRICK. JAS L. ROBERTSON.


THE
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KENSINGTON FIRE BRICK & CLAY
RETORT WORKS.
Kensington Fire Brick Works, Beach & Poplar Sts.
Philadelphia Fire Brick Works and Office, 23d & Vine Sts.
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PHILIP NEUKUMET,

(SUCCESSOR TO JOHN NEUKUMET),

Manufacturer of Fire Bricks, Tiles, Gas and Sugar House Retorts.

☞ Plans of Settings for Benches of Threes, Fives, and Sixes furnished, free of charge, upon application.

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Dry and Wet GAS METERS, Station Meterr (Square, Cylindrical or in Staves) Glazed Meters, King's and Sugg's Experimental Meters, Lamp Post Meters, Etc., Etc., Meter Provers (sizes 2, 5 and 10 feet), Pressure Guages of all kinds, Pressure Registers, Pressure and Vacuum Registers, Pressure Indicators (sizes 4 inch, 6 inch and 9 inch), King's Pressure Vacuum Gauges, Dry and Wet Centre Seals, Dry and Wet Governors, Exhauster Governors, Photometers of all descriptions. Letheby's Sulphur and Ammonia Test Apparatus complete—also Testing and Chemical Apparatus of all kinds, and of the most perfect description, for all purposes relating to Gas.

Goodwin's Improved Lowe's Jet Photometer.

W. W. Goodwin is the author of the History and Principles involved in the use of Lowe's Jet Photometer. (Patentee and we are the SOLE MANUFACTURERS of the ORIGINAL and ONLY DIAL whereby the CANDLE POWER and PRESSURE can be instantly read.)

Special attention to repairs of Meters, and all apparatus connected with the business.

All work guaranteed first class in every particular, and orders filled promptly.

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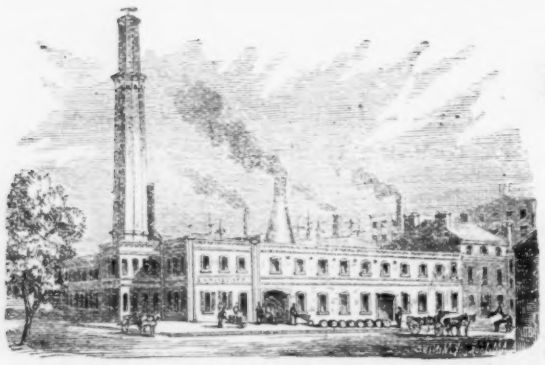

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FIRE BRICK AND CLAY

Retort Works.

☞ *Established in* 1845. ☜

(Branch works at Kreischerville, Staten Island.)

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OFFICE,

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GAS RETORTS, TILES & FIRE BRICK

Of all shapes and sizes.

FIRE MORTAR, CLAY AND SAND.

Articles of every description made to order at the shortest notice.

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FIRE BRICK & ENAMELLED CLAY

Retort Works,

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(Of the late firm of B. Kreischer & Co.,)

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Manufactures of

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Of all shapes and sizes.

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The yield of this Asphalt is nearly double, and the Candle Power more than double the product of Gas Coals, and it is extensively used by great and small companies, chiefly as an enricher and stimulant, in the proportion of five per cent. Yield 15,000 to 16,000 feet per gross ton. Illuminating power 30 to 32 candles. One bushel of lime purifies 6000 feet. Coke very strong. It is incapable of spontaneous combustion or caking in the heap, and is used by simple addition to the charge.

We sell at figures which allow a much larger profit to the purchaser, with better light than any standard coal.

No gas material is at once so safe and so cheap. Our Asphalt is used in the manufacture of Varnish, Roofing, Ship Paint, Tiles, Pavements, Water Proof Paper, Cloth, and for all purposes where a coating is required that is unaffected by Water, Gasses, Alkalies, or Acids.

The Ritchie Mineral Resin and Oil Co.

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CONSUMERS GAS METERS, WET AND DRY,

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Experimental Meters and Standard Test Gasholders,

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Laclede Fire Brick Manufacturing Co.

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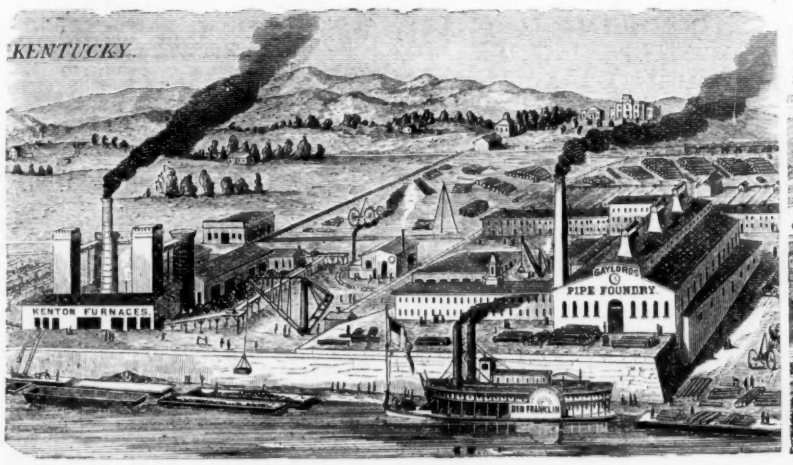
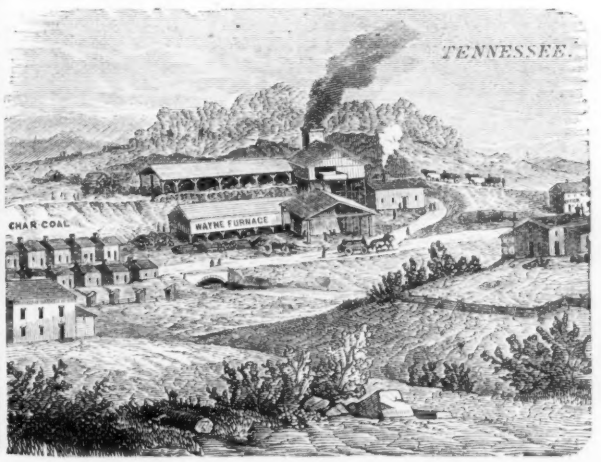




CAST IRON GAS AND WATER PIPE.

And all forms of Special Castings for Gas and Water Works.

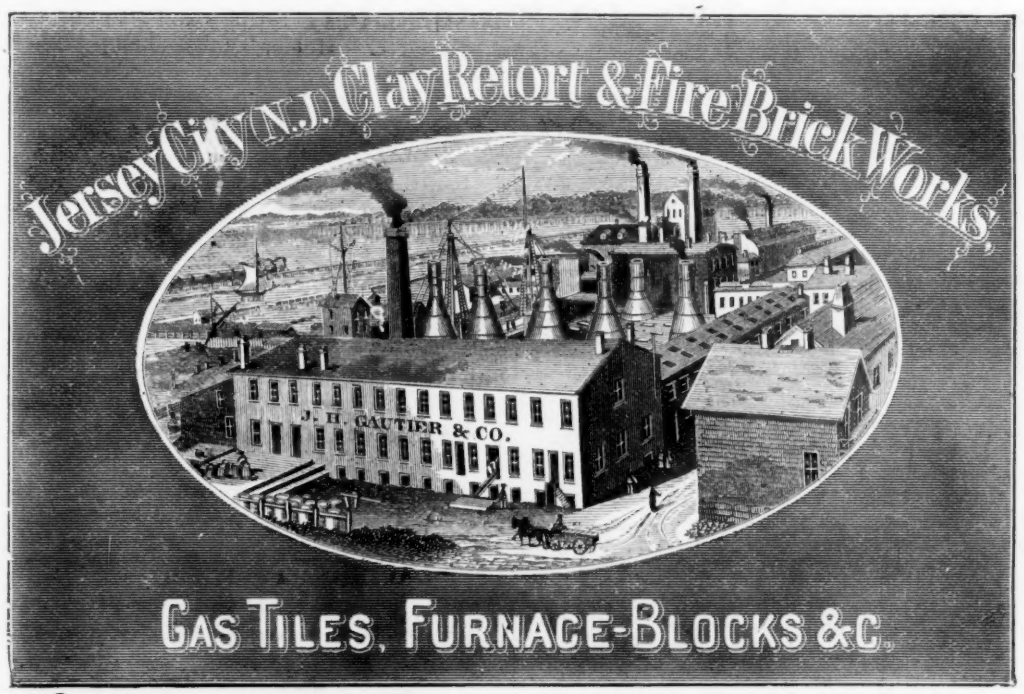
PIPE—2, 3, 4, 5, 6, 8, 10, 12, 14, 15, 16 to 60 inches: above 3 inches Cast in Dry Sand in 12 feet Lengths.

FLANGE, STEAM and HEATING PIPE.

Our KENTON FURNACE gives us a fine quality of Stone Coal Iron; this with our Tennessee Charcoal Iron, which we retain for our Foundry use, enables us, by controlling our Iron, to turn out Castings of a uniform and superior quality, and at a cost advantageous to our Customers.

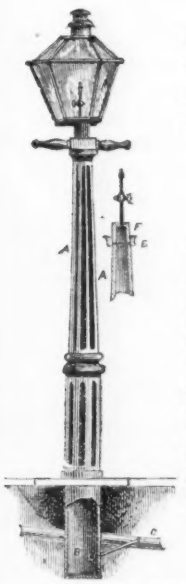
Exclusive Manufacturers of the **ROBBINS JOINT** for Street Mains. The Superintendent of the Indianapolis Gas Company (and many others) say of this Joint: "Its superiority consists of facility in laying, economy in time and lead, and above all, its perfection as a joint.

Estimates given for Furnishing and Laying Street Mains with either common or Robbins Joint.



GRAHAM'S

Patent Anti-Freezing LAMP POST.



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WOOSTER, OHIO
Jan. 24, 1871.

J. W. GRAHAM,

Dear Sir: Yours of the 14th inst at hand. In reply I would say that we have tested the six anti-freezing Lamp Posts purchased from you, and find them to be all as you represented. Whilst nearly a dozen of our sixty-five Posts were frozen down last month and first of this not one of yours was affected by the heavy frost. What can you sell them at?

Yours truly,
LUCAS FLATTERY
Sec'y Wooster Gas-Light Co.

Address the Patentee,

J. W. GRAHAM,
Chillicothe, Ohio.

250-9t

GEO. A. McILHENNY'S

PATENT

VACUUM PROCESS,

FOR RELIEVING GAS RETORTS FROM PRESSURE.

Patented in the United States and Great Britain, June 1867 first patent for this purpose in the United States (but not presented to the public until fully tested). Now in successfu operation for six years, with most satisfactory results.

The many devices lately brought to the notice of the American public, to accomplish the same results are mostly old English contrivances tried and abandoned years ago, on account of the machinery, stuffing boxes, valves, levers, etc., necessary

But the extraordinary results obtained by the McIlhenny process, have induced some unprincipled persons to bring to the notice of the public, as *recent inventions of their own*, some of these old devices; their purpose seems to be simply to evade the patent,

This process is not only safe, simple and effective, but costs little to apply. The only machinery necessary is a one and a half inch stop cock, and a half inch stop cock to each bench No alteration in the old system is required. In fact, a Works operated with this process, can at any time be operated on the old pressure system, simply by closing the two stop cocks above mentioned. There is nothing to get out of order, nothing that requires special attention; no stuffing-boxes to pack and keep tight, no valves to keep clear of tar and pitch, no levers to lubricate, and no expense for a great amount of machinery.

The McIlhenny process challenges the world as regards yield and quality of gas.

For particulars apply to GEO. A. McILHENNY, Engineer of the Washington Gas-Light Co., Washington, D. C., or to WILLIAM YORKE, Engineer of the Portland Gas-Light Co., Portland, Me., who will take pleasure in corresponding with any one interested. 307-1y

THOMAS T. TASKER JR. STEPHEN P. M. TASKER.

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TASKER IRON WORKS, NEWCASTLE, DEL.

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Established 1821.

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Manufacturers and Builders of Gas Works, &c., of all Descriptions, of the Most Approved Plans.

WROUGHT IRON ROOF FRAMES.—For Slate, or Corrugated Iron Coverings, with Cast Iron Cornice Gutter. Iron Doors and Frames, Wrought Iron Pivot Blinds, Windows and all kinds of Castings and Smith Work for Buildings.

BENCH CASTINGS.—Retorts, and all Castings and Wrought Iron Work required for Setting them on the Latest Plan. Tar Gates, Wrought Iron Stand Pipes, Retort Lids, Cotter Bars, Coal and Coke Wagons, and Stokers' Tools.

EXHAUSTERS.—Exhausters and Compensators, By-Passes to pass from 4,000 to 150,000 Cubic feet of Gas per hour, with Engines, Governors, Pressure and Vacuum Guages.

SCRUBBERS.—Single or Multitubular Scrubbers, with Self-Acting Pumps for Ammonia Water.

WASHERS.—Cataract and Single and Multitubular Spray Washers.

CONDENSERS.—Single and Multitubular Air and Water Condensers.

PURIFIERS.—For Purifying from 1,000 to 2,000,000 cubic feet capacity daily, with either wet or dry Lime, or Oxide of Iron, and with either Ash Rivetted or Wrought or Cast Iron Lime Sieves.

CARRIAGES.—Movable Lifting Carriages for Purifiers, arranged either for Floor or Overhead use.

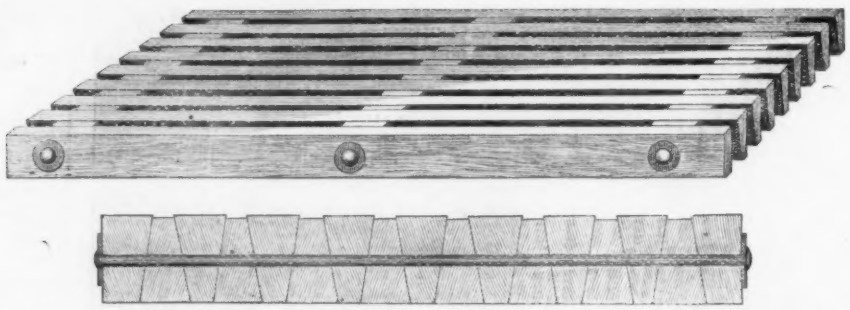
METERS.—Square and Round Meters of any capacity.

GAS HOLDERS.—Single Lift and Telescopic Gasholders, with Cast or Wrought Iron Suspension Frames.

GAS GOVERNORS.—Station Governors, with Regulating and Indicating Columns for Inlet and Outlet Pipes, also Dry Governors with Flexible Diaphragms for Underground Pipes.

STOP VALVES.—Double Faced Stop Valves for Gas or Water, from three inches to forty-eight inches diameter. These Valves are proved on both sides, with a heavy Water Pressure, Flange and Bell Pipes, Fittings and Drips of all descriptions. Steam Boilers and Hot Water Apparatus for Heating Building, and Gas Holder Tanks. Lamp Posts and Lanterns.

P. Munzinger's Patent Ash Lime Trays.



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Pittsburg Gas Company, Pa.
Peoples Gas Company, Baltimore.
Lowell Gas-Light Company, Mass.
Lynn Gas-Light Company, Mass.
Albany Gas-Light Company, N. Y.
Schenectady Gas Light Company, N. Y.
Utica Gas-Light Comwany, N. Y.
Jersey City Gas Company, N. J.
St. Paul Gas-Light Company, Minn.
Cumberland Gas-Light Company, Md.
Hartford City Gas-Light Company, Conn.
Richmond Gas Company, Va.
McKeesport Gas Company, Pa.
Middletown Gas Company, Pa.
East Newark Gas-Light Company, N. J.
Binghampton Gas Company, N. J.
Zanesville Gas Company, Ohio.

New Orleans Gas Company, La.
Salem Gas-Light Company, Mass.
New Britain Gas Light Company, Conn.
Rahway Gas-Light Company, N. J.
Trenton Gas-Light Company, N. J.
Elmira Gas Company, New York.
Erie Gas Company, Pa.
Columbus Gas-Light Company, Ohio,
Westchester Gas-Light Company, N. Y.
Santa Cruz Gas Company, Cal.
Lawrence Gas-Light Company, Kansas.
Salem Gas Company, N. J.
Indiana Gas-Light Company, Pa.
Peoria Gas Company, Ill.
Montclair Gas Company, N. J.
Williamsport Gas Company, Pa.
Wooster Gas-Light Company, Ohio.

Augusta Gas-Light Company, Ga.
Huntsville Gas Company, Ga.
Chattanooga Gas Company Tenn.
Murfreesboro Gas Company, Tenn.
Hagerstown Gas-Light Company, Md.
Hanover Gas Company, Pa.
Easton Gas Company, Pa.
Uniontown Gas-Light Company, Pa.
Coatesville Gas-Light Company, Pa.
Houston, Gas Company, Texas.
Wilkesbarre Gas Company, La.
Middletown Gas Company, New York.
Washington Gas-Light Company, Pa.
Princeton Gas-Light Company, N. J.
Newark Gas Company, Ohio.
Pontiac Gas-Light Company, Mich.
And numerous other Companies.